(No Model.) 2 Sheets—Sheet 1.

N. W. PERRY.

DETECTOR FOR MARSH AND OTHER HYDROCARBON GASES.

No. 350,388. Patented Oct. 5, 1886.

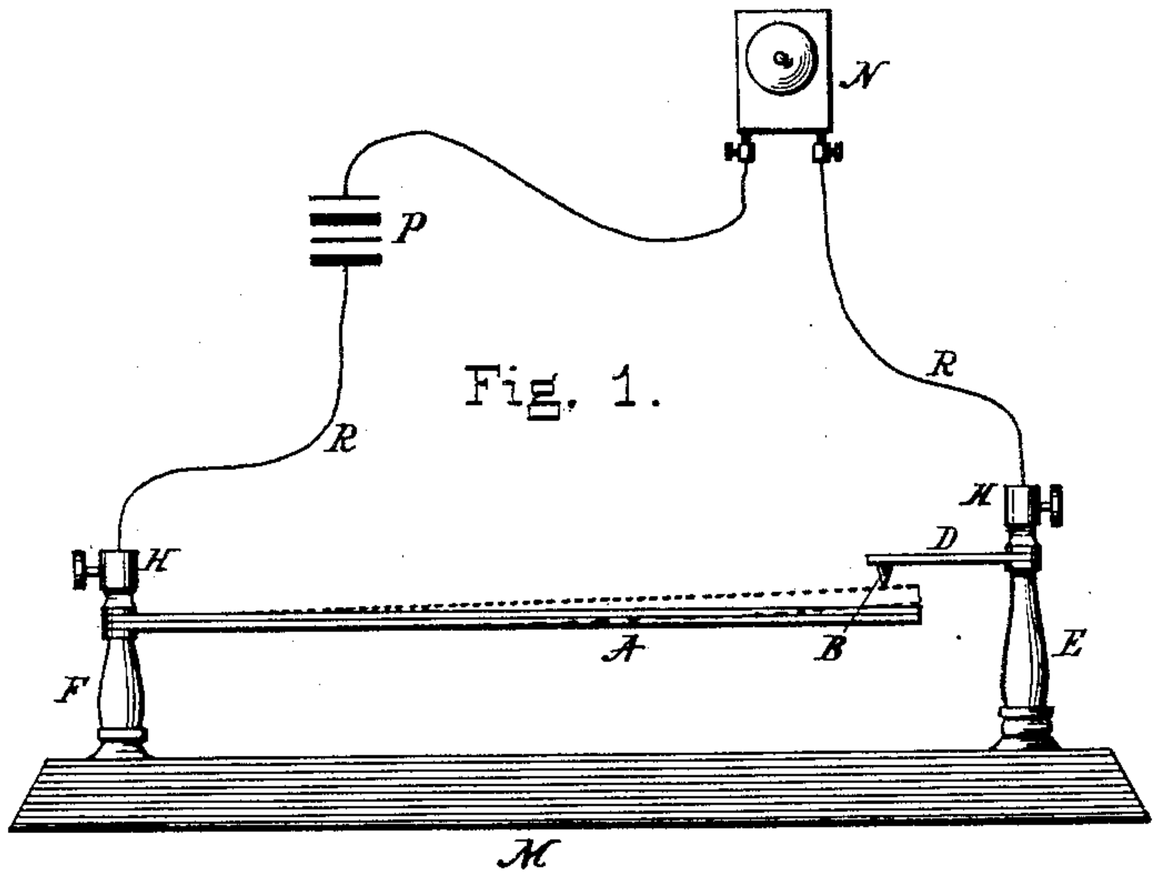

Fig. 1.

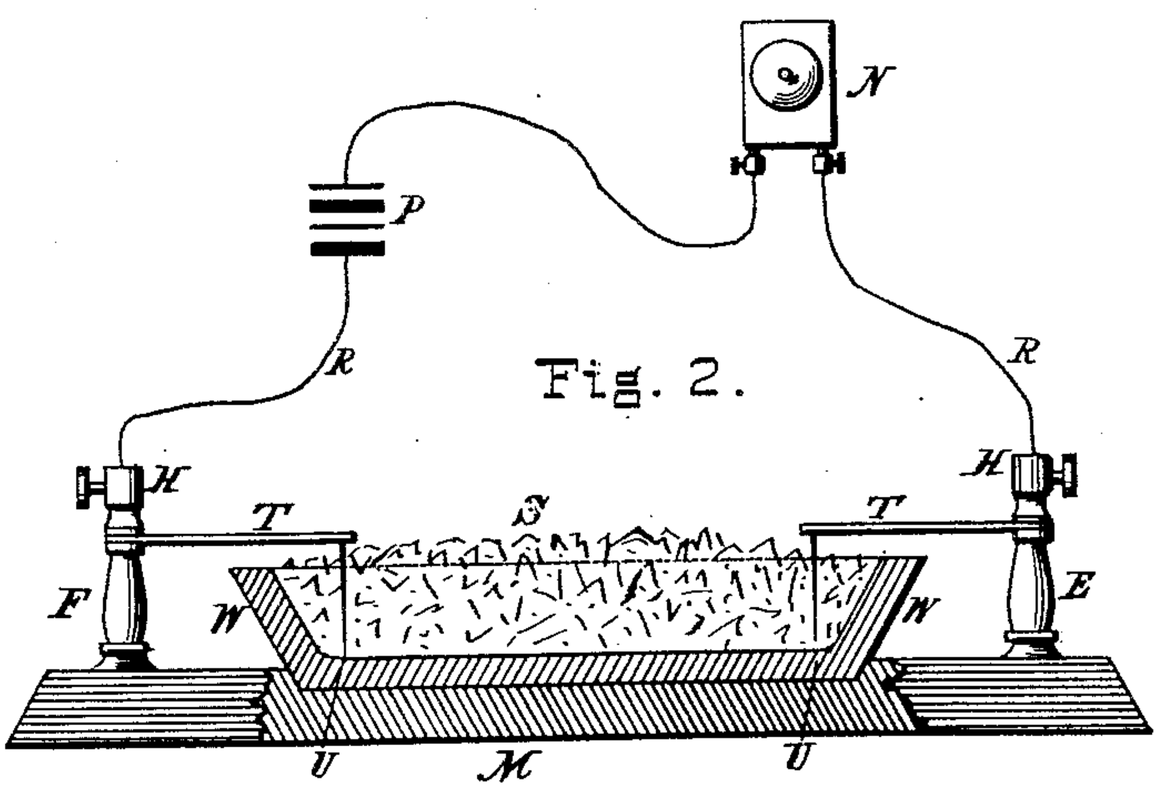

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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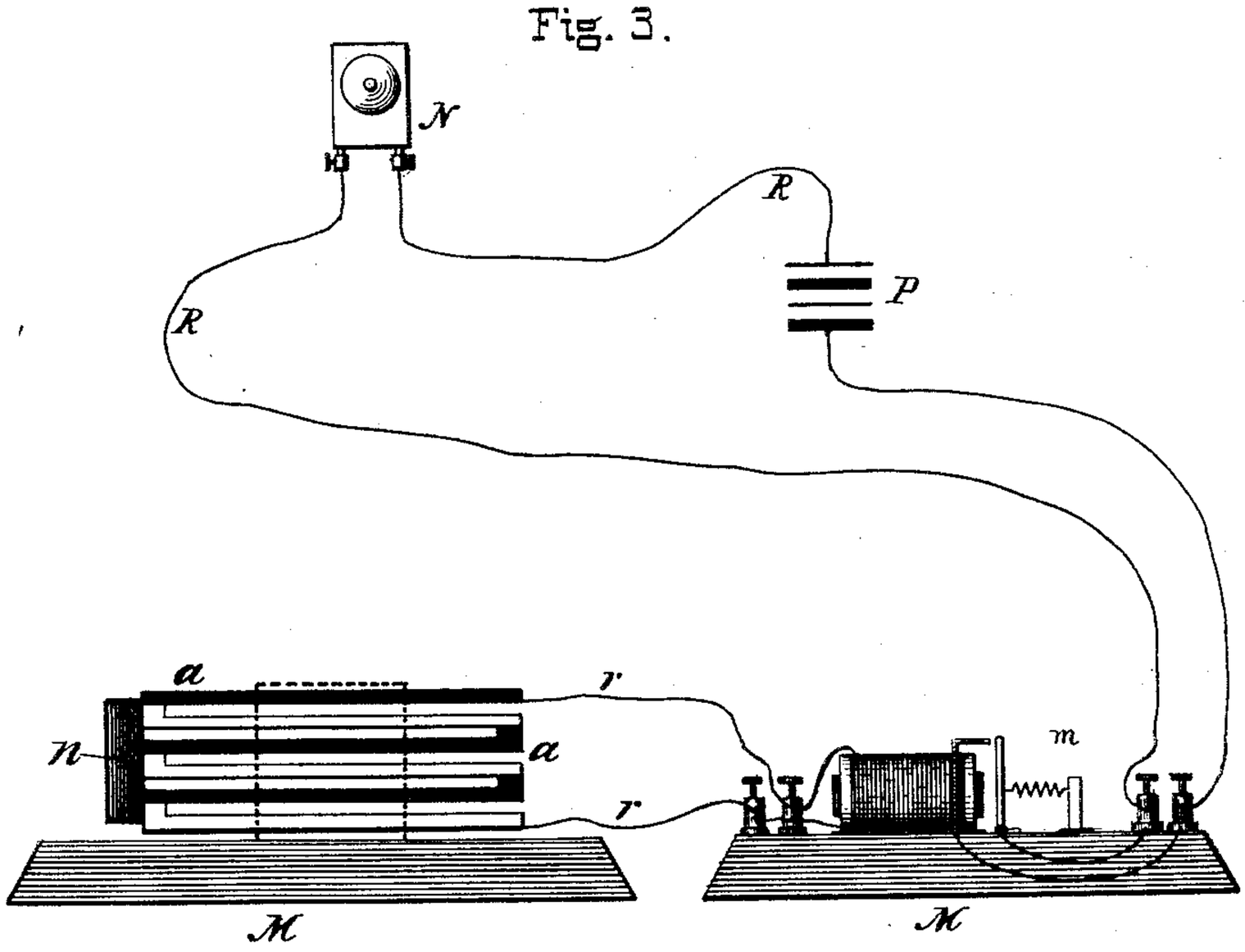
Fig. 3.



Attest,

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UNITED STATES PATENT OFFICE.

NELSON WILLIAMS PERRY, OF NORWOOD, ASSIGNOR OF ONE-HALF TO HERMAN JOHN GROESBECK, OF CINCINNATI, OHIO.

DETECTOR FOR MARSH AND OTHER HYDROCARBON GASES.

SPECIFICATION forming part of Letters Patent No. 350,388, dated October 5, 1886.

Application filed February 15, 1886. Serial No. 192,021. (No model.)

To all whom it may concern:

Be it known that I, NELSON WILLIAMS PERRY, of Norwood, Hamilton county, State of Ohio, have invented a new and useful Improvement in Detectors for Marsh-Gas and other Hydrocarbon Gases, of which the following is a specification, reference being had to the accompanying drawings, forming part thereof, in which—

Figure 1 is an elevation of one way of embodying my invention. M is a base for the standards F E. R R are wires running from the binding-screws H H to the battery P through the alarm-bell N. A is a flat bar composed of a piece of platinum or palladium and a gold plating. B is a contact-point on the tongue D.

Fig. 2 is an elevation of another way of embodying my invention. T T are tongues having points dropping into a film of oxide of palladium, S, in the trough W.

Fig. 3 is an elevation of another way of embodying my invention. *n* is a piece of palladinized charcoal held near the end of a thermal pile, *a*, with wires *r r* running to a binding-post, H, on the base M of a relay, *m*.

The same letters in the several drawings denote the same parts.

My invention relates to the detection of the presence of marsh-gas and other hydrocarbon gases, and more especially to the presence of fire-damp and the gases of natural-gas wells; and it consists, essentially, of an open electric circuit and a metal or the salts of a metal so placed in the circuit that it shall, by change of position, character, or temperature, by reason of its having occluded hydrogen or a combustible hydrocarbon gas, or by the action of said gases on the salt, close said circuit.

My invention is based on these chemical facts: first, that platinum and palladium occlude large quantities of hydrogen and hydrocarbon gases, and by so occluding these gases their bulk is increased; second, that the oxide of palladium, when in the presence of hydrogen and hydrocarbon gases at ordinary temperature, is reduced to the metallic state, and that the oxide of palladium is a non-conductor of electricity, while the metal palladium is a good electric conductor; third, if charcoal be platinized or palladinized, it will in the presence of hydrogen or combustible hydrocarbon gases become heated.

My invention, embodying the first two of these facts, consists in an open electric circuit in combination with platinum or palladium, or their salts, constituting one portion of the circuit, and adapted to close the circuit by reason of the increase in its volume when it shall have occluded a sufficient quantity of hydrocarbon gas. One form of this electrode of platinum or palladium is a flat ribbon, one side of which is plated with gold or any other conducting metal not acted upon by these gases, and the other side is uncovered. This piece of metal (shown in Fig. 1) will by the increased length of the uncovered side, due to the occlusion of the hydrocarbon gases, be bent up, as shown in the drawings by the dotted lines, and so close the circuit.

One form by which the oxide of palladium may be used is shown in Fig. 2, where the wires are shown as dipping into the trough filled with said oxide. When the oxide, by reason of the hydrogen or hydrocarbon gases reducing action, becomes metallic, the open circuit becomes a closed circuit.

An embodiment of my invention is shown in Fig. 3, and is based on the third of the aforementioned chemical facts.

Fig. 3 shows a block of platinized charcoal held securely near one end of a thermal pile. When the charcoal becomes heated by reason of its properties in presence of said gases, one end of the thermal pile becomes heated, a current passes through it, putting into action the electro-magnet of the relay *m*, (shown in Fig. 3,) and the said electro-magnet moves an armature which closes an open circuit.

Operation: When the presence of fire-damp or other dangerous gas may be suspected, the bimetallic bar A, of platinum or palladium and gold, Fig. 1, is included in an electric circuit, as shown; or a film of the oxide of palladium, S, is held in a trough, W, and included in an electric circuit; or a piece of palladinized charcoal, *n*, Fig. 3, is held near the end of a thermal pile, *a*, having conducting-wire running to the relay M, which is connected up in an

electric circuit. All these electric circuits include an alarm-bell. If, now, any of said gases accumulate in any of said places in anything like dangerous quantity, the metal or the oxide or the charcoal, by reason of their properties in presence of said gases, will close said circuits, which, being connected with any suitable alarm, give notice of the presence of said gases.

I claim—

In a detector of fire-damp and other dangerous hydrocarbon gases, the combination of an open electro-circuit, a substance that occludes said gases, so placed in relation to said circuit as to close it by reason of said occlusion or reduction, and an alarm bell or signal, substantially as described.

The foregoing specification of my invention signed by me this 8th day of February, A. D. 1886.

NELSON WILLIAMS PERRY.

Witnesses:

P. J. CADWALLADER,

JEPTHA GARRARD.