2 Sheets—Sheet 1.

H. M. LANE.

Automatic Regulator for Ventilating and other Passages.

No. 196,678. **Patented Oct. 30, 1877.**

Fig. 2.

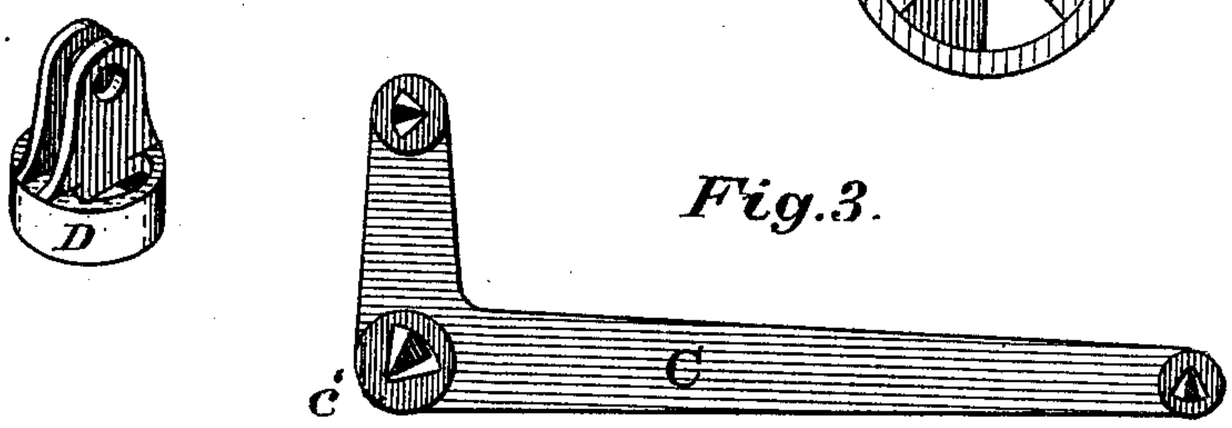

Fig. 3.

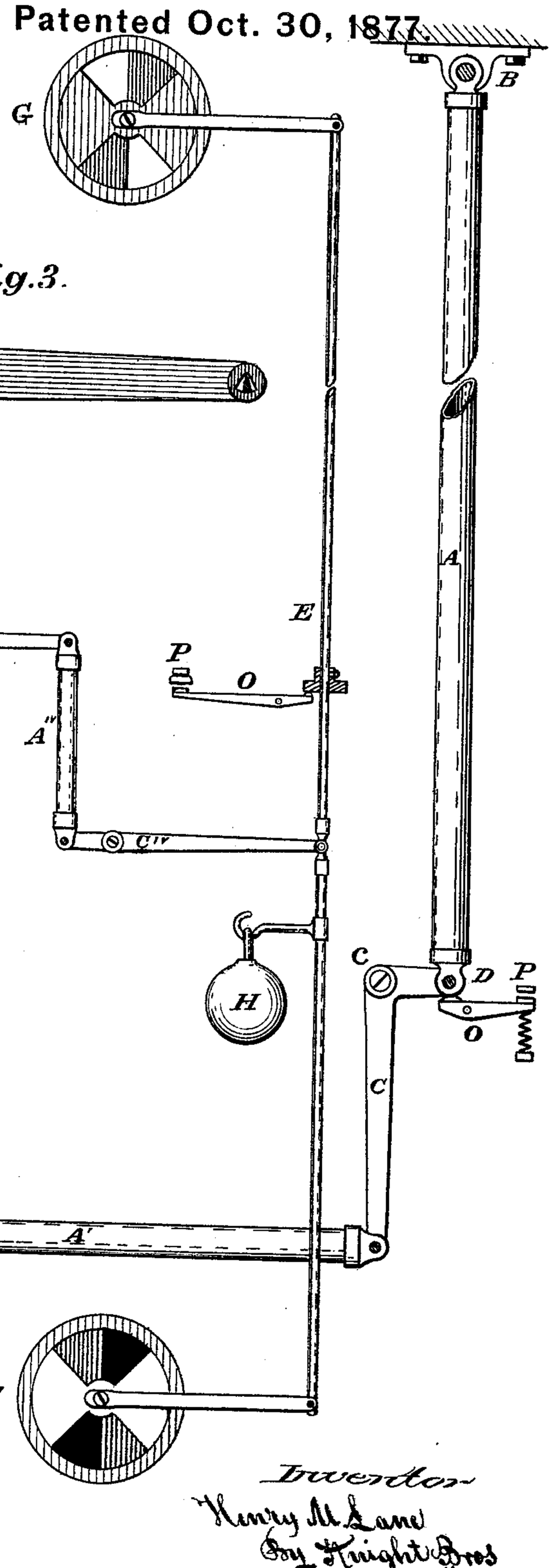

Fig. 1.

Attest.
Walter Knight
Herbert A. Knight

Inventor
Henry M. Lane
by Knight Bros
attys.

2 Sheets—Sheet 2.

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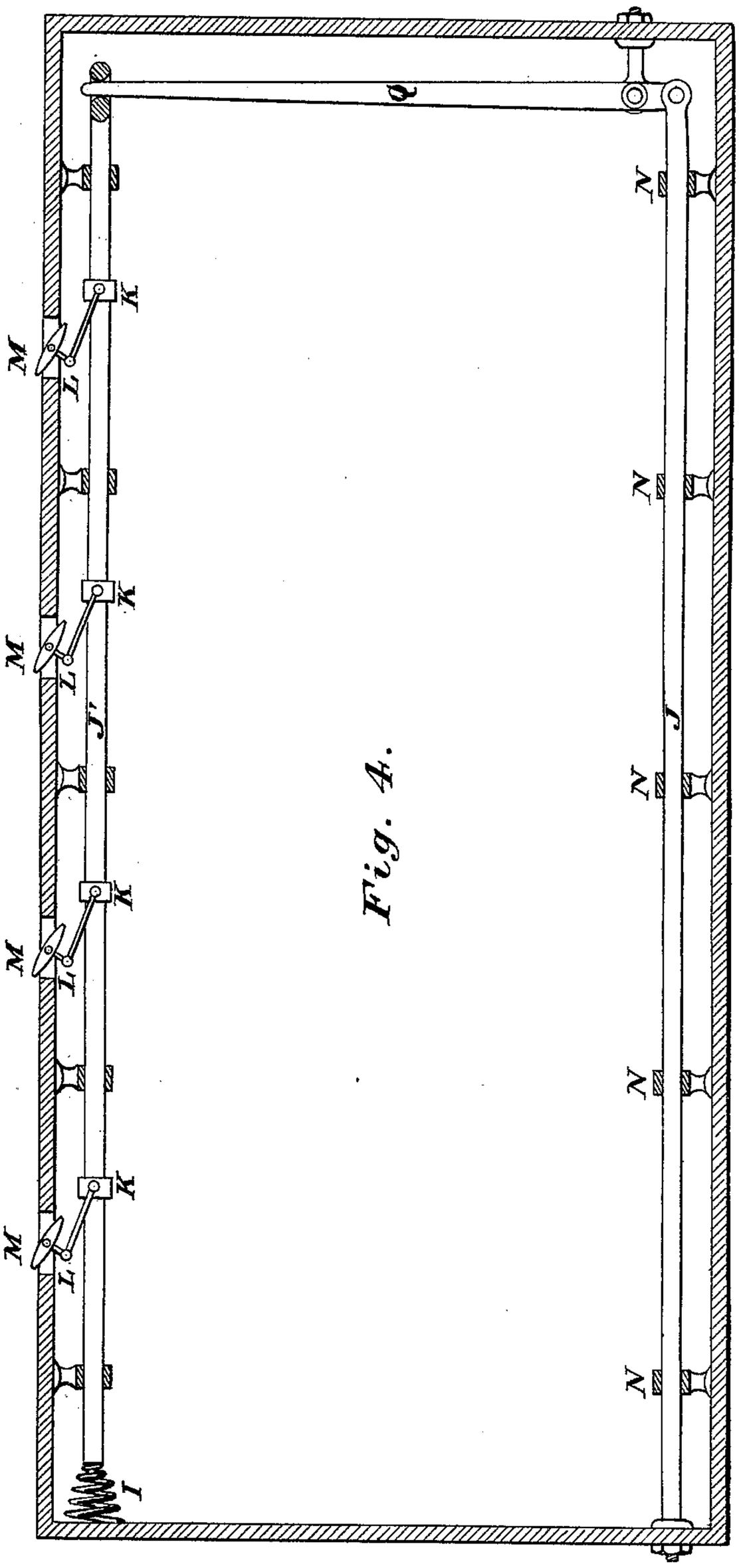

Fig. 4.

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Walter Knight.
Herbert Knight

Inventor
Henry M. Lane
By Knight Bros. Attys

UNITED STATES PATENT OFFICE.

HENRY M. LANE, OF NORWOOD, OHIO.

IMPROVEMENT IN AUTOMATIC REGULATORS FOR VENTILATING AND OTHER PASSAGES.

Specification forming part of Letters Patent No. **196,678,** dated October 30, 1877; application filed May 7, 1877.

To all whom it may concern:

Be it known that I, HENRY M. LANE, of Norwood, Hamilton county, Ohio, have invented a new and useful Automatic Regulator for Ventilating and other Air Passages, of which the following is a specification:

My invention relates to a device for the automatic regulation of warming and ventilating apertures, and, in its principal form, comprises a provision (in the room to be warmed and ventilated) of one or more open-ended tubes, connected to valves in the air-passages by means of one or more levers, and to an opposing spring or weight, which, by preventing lost motion, utilizes the entire molecular action of the tubes consequent on changes of temperature. These tubes combine strength and lightness with large superficial exposure.

Coupled with my aforesaid primary device, or with a single expanding-tube, may be a means of making any excessive elongation of the tube or tubes felt on a fire-alarm signal, and, if desired, also on a drenching apparatus.

In the accompanying drawings, Figure 1 is a front elevation of a regulating apparatus embodying my improvements. Fig. 2 is a perspective view of one of my coupling-thimbles. Fig. 3 is a side elevation, to a larger scale, of one of the levers employed by me. Fig. 4 represents, by plan view, an adaptation of my invention to the ventilation of a railway-car.

A A^{i} A^{ii} A^{iii} A^{iv} are a series of metallic tubes, of which the first and largest one, A, is attached to the ceiling or other fixture of the room, as at B, and is coupled to the next tube, A^{i}, in the series by means of a lever, C. In like manner the other tubes are coupled consecutively by levers C^{i} C^{ii} C^{iii}, fulcrumed, as at *c*, to the wall or other fixture of the room. The connection of the tubes and levers is made by thimbles D, whose construction admits free access of the air of the apartment to the interior of the tube. The last and smallest tube in the series is connected, by lever C^{iv}, to a rod, E, which may be connected to a hot-air register, F, and also to a ventilating register or shutter, G, or either of them. A weight, H, is appended to the rod E.

The various bearings may have knife-edges, as at c^{i}, Fig. 3, similar to those commonly employed in weighing apparatus, for the purpose of diminishing friction.

My invention is susceptible of various modifications and adaptations. For example: Instead of the weight H, a spring, such as shown at I, Fig. 4, may be employed to take up lost motion, and insure positive and continual contact of all the bearing-surfaces.

My invention, as applied to the automatic regulation of the ventilating and warming devices (either or both) of a railway-car or other vehicle, is shown in Fig. 4, in which a tube forms one rod, J, of the curtain-rods, being firmly fixed to the car-body at one extremity, *j*, is utilized as the expanding and contracting member, by connection, through lever Q, with the other curtain-rod, J′, which latter is connected, by means of bars K, with arms L on ventilating-shutters M; or each curtain-rod may be attached to the car-body, and be connected by lever with a rod specially provided for transmitting motion to the ventilating-shutters. In the same manner a warming device may be automatically regulated.

A weight, acting on the rod J′ through a suitable bell-crank, may be substituted for the spring I. The customary supporting-rings N may serve as guides to prevent lateral deflection or buckling of the rods.

Of other important applications of my invention I may particularize that of sounding an alarm-signal, and also that of operating a fire-quenching apparatus. These objects may be effected by the provision of a trigger, O, which, when the heat approaches that of a conflagration, will be impinged on by the then greatly elongated tube, and will, through a galvanic or other connection, P, liberate a wound-up weight or spring, that shall sound an alarm apparatus, and, if desired, open at the same time a system of ajutages for water or other extinguishing agent.

It is apparent that my congeries of tubes and levers are subject to the action of two constantly-opposing motive forces residing in the expanding tubes operating in one direction, and of the spring or weight operating in the other direction. It is also manifest that these forces, by maintaining a permanent opposing pressure against the opposite extremi-

ties of the expanding and transmitting mechanism, preserve a constant and positive contact of all the bearing-surfaces, and prevent the lost or slack motion that would otherwise be completely fatal to the operation.

With that form of my invention illustrated in Fig. 1, the motion of the rod E which operates the registers is, of course, compounded of those of the respective tubes, multiplied by the product of the leverages between them and said rod, whose motion may thus be made of any amplitude by an apparatus occupying but very little room. Indeed all of it, except the tube A and rod E, may be comprised in the space between an ordinary window and the floor, and may be hidden from sight by a suitable screen, if desired.

If used only for operating a fire-alarm or a fire-extinguisher, a single tube, A, may act directly upon such trigger.

In the foregoing illustrations of my invention I have shown the counteracting spring or weight so arranged as to act in opposition to the thrust or elongation of the tube or tubes; but it is evident that the arrangement may be such as for the counteracting forces to operate by pulling away from one another, instead of pushing against one another, as herein shown.

I claim herein as new and of my invention—

1. An open tube and a lever, or a series of them, in the described combination, with an opposing spring or weight, for prevention of lost motion, and with one or more ventilating or other registers, as and for the purpose set forth.

2. In a railway-car or other vehicle, the combination of tube J, fixed at one end and having its other end pivoted to a lever, Q, which lever is pivoted to a rod, J′, having connection K L, with one or more valves or shutters, M, controlling ventilating or other air passages, and subject to the counter-pressure or tension of a spring, I, or its equivalent, substantially as set forth.

3. In combination with a tube, A, having one fixed end, or with a congeries of rods or tubes, connected with such tube A by levers, in the manner described, the devices E O P for the automatic operation of one or more warming, ventilating, or safety apparatus, substantially as set forth.

4. The open-ended tube J, adapted to form a curtain-rod of a railway-car or other vehicle, in the manner set forth.

In testimony of which invention I hereunto set my hand.

HENRY M. LANE.

Attest:

GEO. H. KNIGHT,

L. H. BOND.