C. H. POND.

FIRE-ALARM TELEGRAPH REPEATERS.

No. 188,181. Patented March 6, 1877.

Fig. 1.

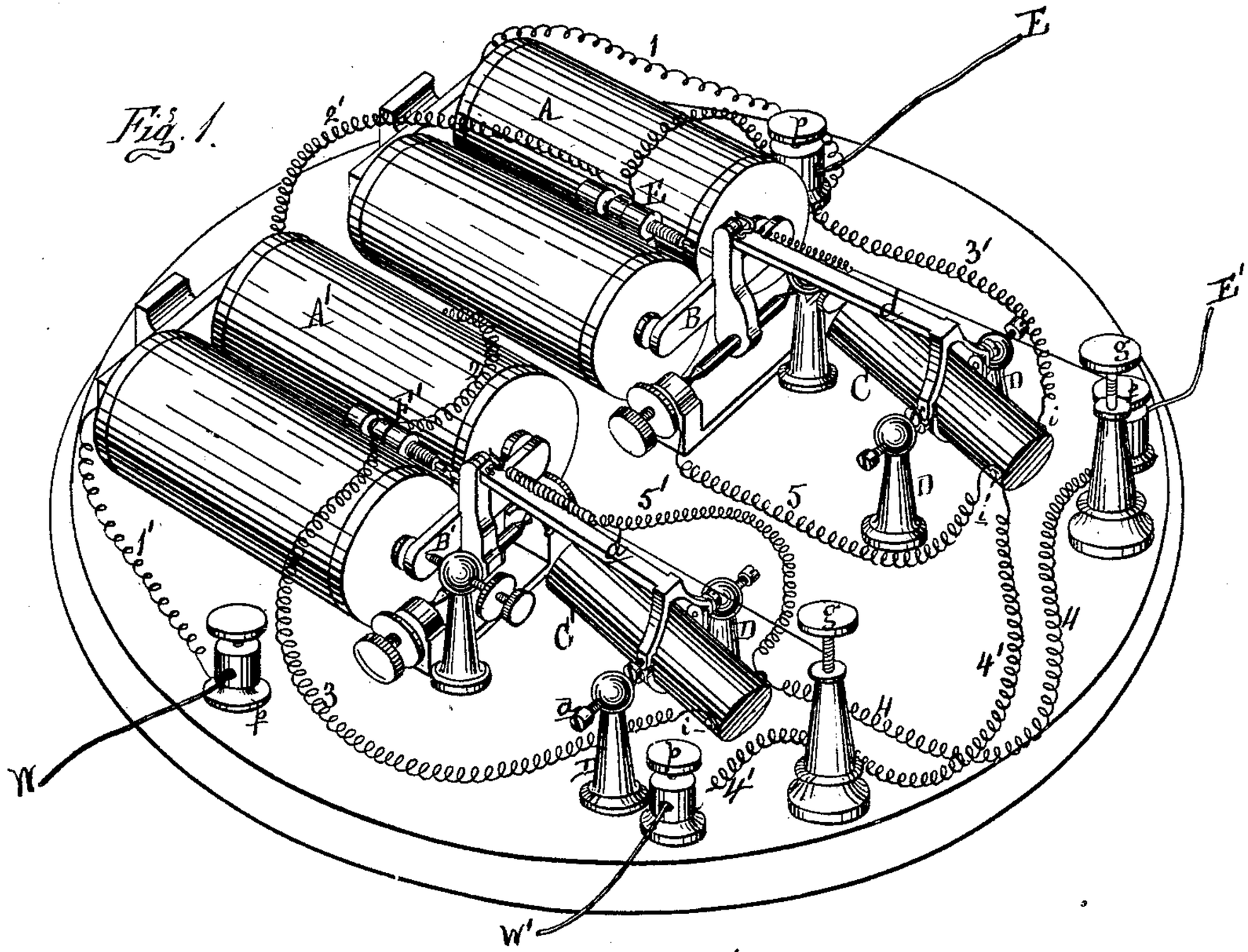


Fig. 2.

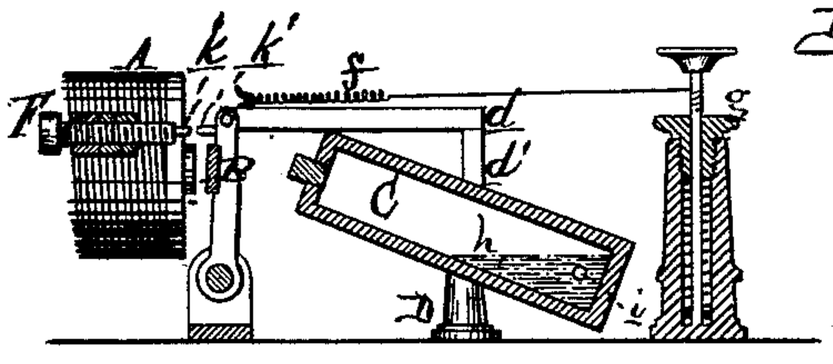


Fig. 4.

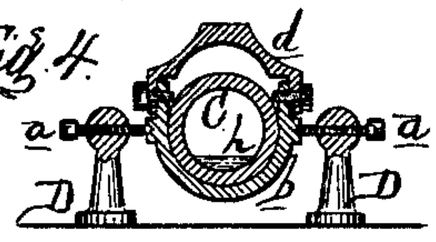
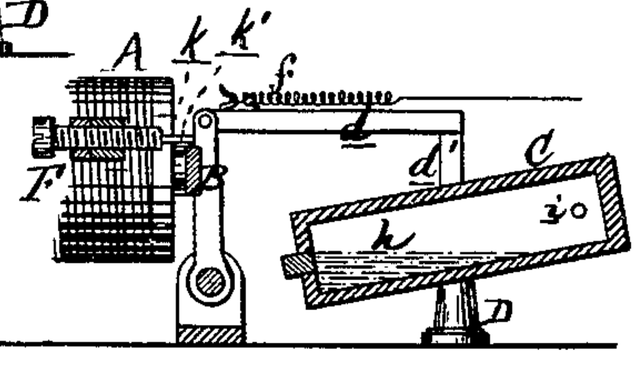


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHESTER H. POND, OF JACKSON, MICHIGAN, ASSIGNOR TO THE MICHIGAN FIRE ALARM COMPANY, OF SAME PLACE.

IMPROVEMENT IN FIRE-ALARM-TELEGRAPH REPEATERS.

Specification forming part of Letters Patent No. **188,181**, dated March 6, 1877; application filed February 19, 1877.

To all whom it may concern:

Be it known that I, CHESTER H. POND, of Jackson, in the county of Jackson and State of Michigan, have invented an Improvement in Repeaters for Fire-Alarm Telegraphs, of which the following is a specification:

The nature of my invention relates to an improvement in devices for transmitting or repeating the signals made upon, or caused by, the opening and closing of the electric circuit in a given loop or district to the other loop or loops in the fire-alarm system, so that if the circuit be broken in one loop it will be broken in the others, and will remain so until it is again closed in said loop.

If, from accident or design, the circuit should remain permanently broken in one circuit-loop, it is necessary to provide means for closing the other loops; otherwise the entire system would be disabled. Heretofore this has been accomplished by mechanical means, which would act in closing the loops after they remained open a given length of time.

The object I have in view is to provide each magnet in the repeater with a device which will automatically close the circuit of an opposite loop directly after it has been broken; and to this end it consists, mainly, in a tilting mercury-tube, actuated by the armature, in combination with the connections to the loops and magnets, as more fully hereinafter set forth.

Figure 1 is a perspective view of a two-circuit repeater. Fig. 2 is a longitudinal vertical section through a mercury-tube at *x x*, tilted back as when the circuit through the magnet to whose armature it is connected is broken. Fig. 3 is a similar section, showing the position of the tube when the circuit is completed through the said magnet. Fig. 4 is a cross-section at *y y*.

In the drawing, A A′ represent two electro-magnets, placed side by side upon a suitable base, provided with binding-posts *p*, with which the wires E E′ and W W′ of an eastern and a western loop are connected, as shown. B B′ are the armatures of the magnets, in front of which are respectively hung the cylinders C C′, of hard rubber, between posts D D, through which trunnion-screws *a* are tapped to pass into sockets in a cradle, *b*, which supports each tube at the center, and whose ends extend above the trunnions *a*. To these ends a fork, *d′*, pendent from a rod, *d*, is pivoted by screws *c c*, as seen in Fig. 4. The front end of the rod *d* is pivoted to the upper end of the armature-lever, of which *f* is the spring, attached by a cord to the adjusting-screw *g*.

When the circuit is broken, the armature-spring, in retracting the armature-lever, through the connections above described, tilts back the tube, as seen in Fig. 2; but when the circuit is completed the tube is tilted forward, as seen in Fig. 3.

Near the base of each tube an iron screw, *i*, is tapped into it from each side, and before the tube is sealed up at the end nearest the magnet a small quantity of quicksilver (represented at *h*) is introduced, so that if the tube be tilted back the points of the screws *i i* would be submerged, and an electric current might be passed from one screw to the other.

Between the spools of the several magnets binding-posts F F′ are erected, each having a contact-point, *k*, opposing a corresponding point, *k′*, on the face side of the armature-lever.

The connections in this repeater are made as follows: From the post *p*, to which the main-line wire E is attached, a wire, 1, is run to the magnet A; thence, by a wire, 2, to the post F′ between the helices of the magnet A′; thence, by a wire, 3, to the base-screw *i* of the tube C′; then another wire, 4, connects the other screw *i* of said tube C′ to the post *p*, to which the main wire E′ is connected. When the circuit in the magnet A′ is broken, the electric current will pass through the mercury in the tube C′, (then tilted back,) and thus complete the circuit through the line E E′. Wires 5 and 5′ connect the base-screws *i* of the tubes C C′, respectively, with the armature-centers of the magnets A and A′. By means of the wires 1′, 2′, 3′, and 4′, corresponding connections are made with the main-line wires W W′ of the other loop.

When the circuits are uninterrupted, the electric current passes from the line E, through wire 1, into and through magnet A; thence, through wire 2, to post F′; thence, through

the points *k k'* and wires 5' and 4, back into main line E'. The current through the circuit W W' passes, in like manner, through the corresponding opposite connections.

It follows, then, that when the circuit in both loops is normally complete the current must pass through the points *k k'* of each armature. Hence, if the circuit be broken in the line E E', the magnet A will be discharged, its armature will fall back, thereby breaking the circuit of loop W W' through the points *k k'* of said magnet. The circuit of line W W' remains broken until the mercury-tube C, in tilting back, has submerged its screws *i i*, which recomplete the circuit through the line W W', in the manner first above described. The operation of breaking and closing the circuit in the opposite loop is the same.

What I claim as my invention is—

In a fire-alarm-telegraph repeater, substantially as described, the tilting mercury-tubes C C', actuated by the armatures of the magnets A A', for repeating or transmitting the signals from one circuit to another through the connections, substantially as described.

CHESTER H. POND.

Witnesses:
H. F. EBERTS,
H. S. SPRAGUE.