No. 16,828. PATENTED MAR. 17, 1857.

M. G. FARMER & A. F. WOODMAN.

TELEGRAPHIC REPEATER.

2 SHEETS—SHEET 1.

Fig. 1.

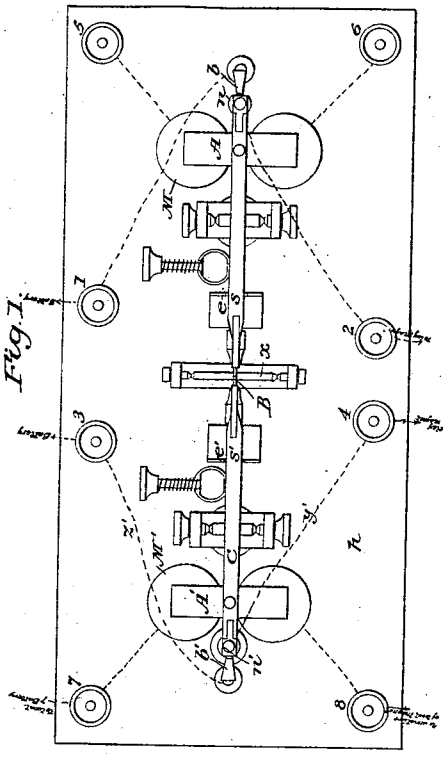


Fig. 2.

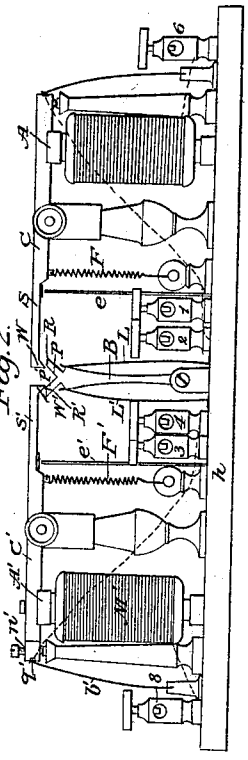
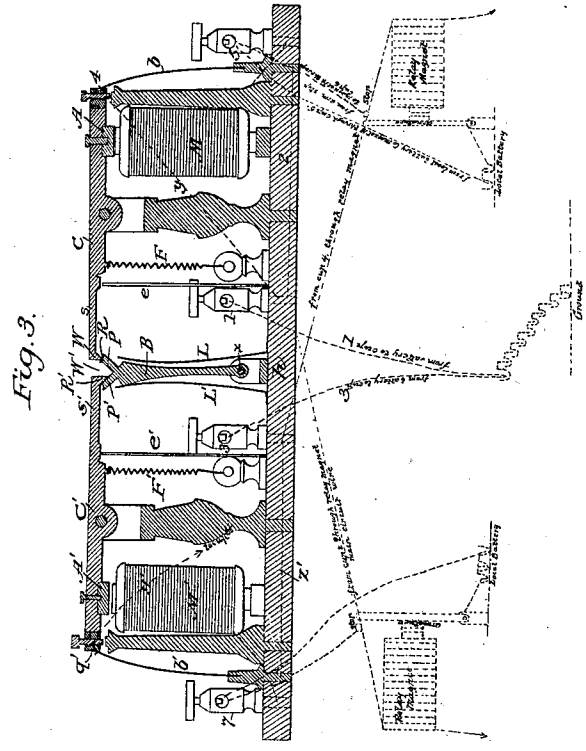


Fig. 3.



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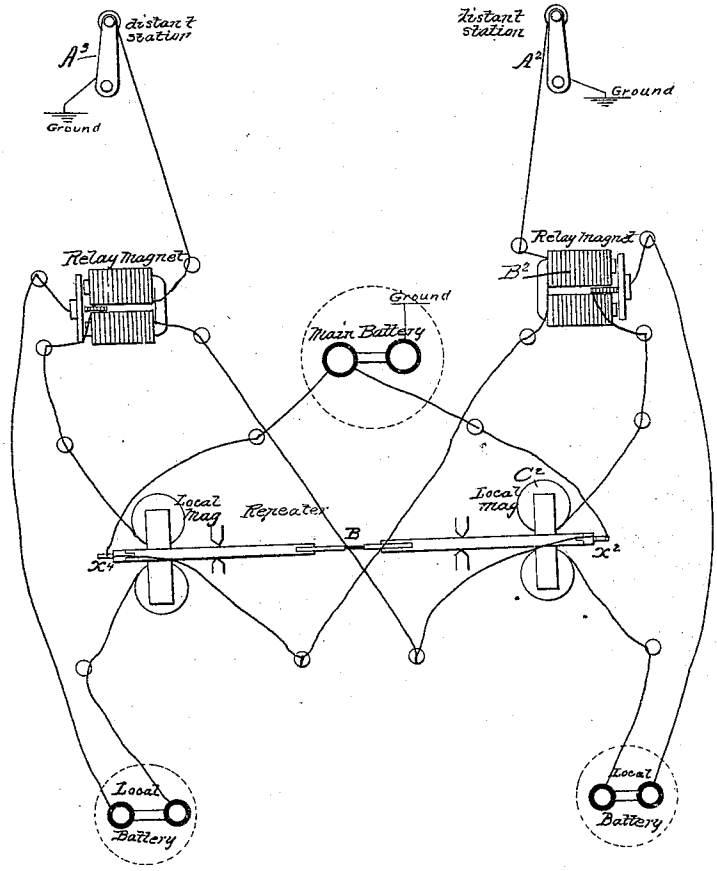
TELEGRAPHIC REPEATER.

2 SHEETS—SHEET 2.



UNITED STATES PATENT OFFICE.

M. G. FARMER, OF SALEM, MASSACHUSETTS, AND A. F. WOODMAN, OF PORTLAND, MAINE.

IMPROVEMENT IN TELEGRAPHIC REPEATERS.

Specification forming part of Letters Patent No. **16,828**, dated March 17, 1857.

To all whom it may concern:

Be it known that we, MOSES G. FARMER, of Salem, in the county of Essex and State of Massachusetts, and ASA F. WOODMAN, of Portland, in the county of Cumberland and State of Maine, have invented a new and useful Improvement in Telegraphic Repeaters; and we do hereby declare that the following specification and the accompanying drawings, with their letters and references, constitute a full and exact description of the same, enabling persons skilled in the use of telegraphic apparatus to make and apply the same.

The object of the repeater is to so connect two main telegraphic circuits that communication can be effected from one to the other reciprocally; and the difference between other and our repeaters is this: In other repeaters previously used for the same purpose the independent circuit was prevented from being broken by the breaking or by the closing of a local circuit, which depended upon the instantaneous action at the proper time of a local magnet. This action, under certain circumstances, will not take place at such proper time, and the consequence is that the dependent circuit breaks the independent circuit. With our repeater, to prevent such breaking of the independent circuit, we interpose a mechanical obstacle, which prevents such breakage until after both main circuits have been closed and their local armatures have been attracted to their magnets, and the operation is always certain.

Figure 1 of the drawings represents a top view, Fig. 2 a side elevation, and Fig. 3 a vertical central and longitudinal section, of our repeater.

In the drawings, upon a platform, *h*, are placed two local magnets, M M′, with their armatures A A′, retracting-springs F F′, and stops *e e′*, arranged as represented.

A rocking beam, B, is fixed upon a shaft, *x*, and has at its top two inclined faces, P P′, and two stops, R R′, as seen in Figs. 2 and 3. When not operated upon by either or both of two cams, W W′, this beam is maintained in a vertical position by the action of two springs, L L′. These cams W W′ are placed on the adjacent ends S S′ of the armature-levers C C′, and they are brought down into contact with the beam B (whenever the magnets M M′ are discharged) by the retracting-power of the springs F F′. Whenever either cam W W′ is brought down against the beam B (said beam being in its vertical position) it tips the beam to one side, so that when the other cam immediately afterward descends it will strike upon and be stopped by the top of the beam, and cannot descend farther until the beam again assumes its vertical position, and, furthermore, it keeps the beam in such inclined position so long as it so rests upon the top of the beam. These devices of the beam and tipping-cams constitute the mechanism which effects the results we will now proceed to describe.

In Fig. 1 are seen eight screw-cups, marked 1, 2, 3, 4, 5, 6, 7, and 8. The cups 1 and 2 include the instrument in or receive the wires of what we will term "eastern main circuit." The cups 3 and 4 in a similar manner include the instrument in what may be termed the "western main circuit." The cups 5 and 6 receive the wires of the western local circuit and the cups 7 and 8 those of the eastern local circuit. These circuit-wires and the relative position of the relay-magnets are shown by dotted lines in Fig. 3, and will be understood by the references thereto on the drawings, Fig. 1 also showing some of the connecting-wires by dotted lines.

Two springs are placed one at each end of the platform *h*, (they being marked *b b′*,) the tops of which are brought into contact or break contact with two metallic connectors, *q* and *q′*, as the armature-levers C C′ are tipped to their full extent. The connectors *q q′* receive from the cups 3 and 4 the ends of the two main-circuit wires *y y′*, and the springs *b b′* receive from cups 1 2 the ends of the other main-circuit wires, *z z′*, the other ends of said wires *y y′* proceeding east and west through the relay-magnets, and the other ends of wires *z z′* proceeding to the battery, and thence to the ground, thus completing these main circuits. The connectors *q q′* are attached to insulated pipes *n n′* on the outer ends of the armature-levers. If, now, when the armatures M M′ are both attracted to their magnets, one of the main circuits—say the eastern—is broken at any distant station, the armature A′ will be retracted by its spring F′, the wedge W′ will descend and tilt the beam B, the point of the spring *b′* will slip from contact with the connector *q′* and

break the western main circuit at this point. This will discharge the western local magnet M, whose armature A would be retracted by its spring F, and its cam or wedge W would strike upon and be stopped by the top of the inclined beam B and prevent the breaking of contact of the spring *b* and connector *q*, which will prevent the breaking of the eastern main circuit at *q*, and it cannot be broken at the instrument so long as the mechanical obstacle remains. The parts are shown in this position in Fig. 3. If, now, the eastern circuit be again closed at said station, the armature A will be attracted by its magnet, the western circuit will be closed at *q'*, the western local magnet will be charged and attract its armature A', and the beam B, being thus released from the action and contact of the wedges W W', will assume its vertical position by the action of its spring L.

Our improvement is further illustrated in Fig. 4 of the accompanying drawings, to which the following letters and references allude: A^2 A^3 represent two distant stations, our instrument being supposed to be placed at an intermediate one. Now, from what has been said before, it will be readily understood that if, for instance, the independent circuit be broken by an operator at A^2, the relay-magnet at B^2 will be discharged, and this will discharge the local magnet at C^2 and break the dependent circuit at x^2. This will cause the lever B to be tipped, and thereby, as before explained, prevent the independent circuit being broken at the instrument or at x^4.

From this description it will be seen that the main circuit which is first broken (which may be called the "independent circuit") determines which way the beam B shall incline, and that this inclination, while it allows the instrument to break the dependent circuit, prevents it from breaking the independent circuit in the instrument.

What we claim as our invention or improvement in telegraphic repeaters is—

The use of a mechanical obstacle essentially in the manner as set forth, whereby, when the independent circuit has broken the dependent circuit at the instrument, the dependent circuit is prevented from breaking the independent circuit.

In testimony whereof we have hereto set our signatures this 11th day of October, A. D. 1856.

MOSES G. FARMER.
ASA F. WOODMAN.

Witnesses:
JOHN NOBLE,
FRANCIS GOULD.