

Patented, Sep. 17. 1867.

The diagram shows a mechanical testing apparatus. It consists of a rectangular frame with a horizontal beam at the top and a vertical support on the right. A specimen, labeled 'a.', is mounted on a base and is connected to a lever arm. The lever arm is pivoted at the top of the frame and has a weight or force applied to it, labeled 'b.'. The specimen is held in place by a clamping mechanism, labeled 'c.'. The entire setup is designed to measure the strength of the specimen under a controlled load.

A diagram showing a cross-section of a multi-rod assembly. It consists of several vertical rods of varying heights and widths. The rods are labeled with letters: *p*, *v*, *q*, *q'*, *v'*, *p'* from left to right. Below the rods, there are labels *u* and *w* under the first two rods, and *κ* under the last rod. The rods are connected by a horizontal line at the top, which is shaded with diagonal lines. The entire assembly is shown in a perspective view.

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IMPROVEMENT IN FIRE-ALARM TELEGRAPHS.

Specification forming part of Letters Patent No. 69,039, dated September 17, 1867.

To all whom it may concern:

Be it known that I, JOSEPH B. STEARNS, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Telegraphic Fire-Alarm, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a perspective view of the apparatus. Fig. 2 is a longitudinal vertical section of the magnets, armature, &c., when the latter is drawn toward the detent. Fig. 3 is a longitudinal vertical section of the magnets, armature, &c., showing the position of the latter when the current of electricity is reversed. Fig. 4 is an elevation of the operating-drum for directing and reversing the electric currents, with a portion broken away.

Similar letters indicate like parts in the several figures.

My invention is designed to be applied more particularly to fire-alarm telegraphs; and the object of the invention is to simplify the operation of working electric telegraphs to effect a great reduction in the length of wire necessary for the whole system, and thus to effect great saving in the expense of building and operating lines; furthermore, to prevent all accidental striking of the bells by foreign currents, unless said currents are passing in an opposite direction to those operating the bell-machine, and strong enough to neutralize the latter and have a surplus of power over and above the same sufficiently strong to work the machine, as may happen by shocks of lightning or other atmospheric influences; and, lastly, to secure greater precision and certainty of action.

My invention consists in working both the bell-tower machine and the signal-boxes in one and the same circuit by arranging a steel armature in such a manner that it will act upon the detent in two different ways by twice reversing the circuit. The armature, being pivoted in the usual way, is provided with two arms, with rests for the detent. When the armature is attracted by one or more magnets toward the detent and the current is reversed, it will be repulsed and attracted by the opposite magnets, and the lower arm will be raised

and arrest the detent. By again reversing the circuit the detent becomes released, falls, and acts upon the tower-bells by releasing the train of wheel-work. The magnets in the signal-boxes, being simply electro-magnets, are not operated by the reversal of the current, but are operated by breaking and closing the circuit, and will not operate the bell-machine magnets on account of the armature being held against the first magnet by reason of its own magnetism.

Referring to the drawings, *a a' a'*, &c., represent magnets, of which there may be one or more pairs, with a steel armature, *e*, pivoted at *h h*, and provided with the two arms *f* and *g*, and working between the poles *i i' i'*. The detent, consisting of two arms at right angles, or nearly so, is attached to an arbor, *c c*, which is journaled in two standards, *s s*. The magnets *i i' i'* are connected in such a manner that the steel armature *e* will be drawn toward the detent when at rest, the end of arm *b* being supported by the rest or catch of arm *f* of armature. When the current is reversed by the reversing-cylinder *k*, or otherwise, the polarity of the steel armature remaining the same, it is forced off by the first electro-magnet *i i'*, against which it rests, and is also attracted by the other or second electro-magnet *i' i'*, the arm *f* of armature will fall back, allowing the detent to fall until the arm *b'* is caught by the rest or catch of the lower arm, *g*, of the armature. When the current is again reversed the lower arm of the detent is fully released, allowing the weight *d* to fall, and thus releasing the train of wheel-work and operating the machine in the usual manner.

The reversing-cylinder *k* is provided with annular metal rings *p p' q q'*, &c., which are in contact with the conducting-springs *m m' n n'*, respectively. The wires *u u'* connect and carry the circuit to the rings *p* and *q* and *p' q'*. The insulated wires *v v'* connect and carry the circuit to the rings *p q'* and *p' q*, respectively, and in such a manner that the insulated wire *v* passes through a recess in the cylinder underneath the ring *q* to the ring *q'*, and the wire *v'* passes in a like manner to ring *q*. The rings *q q'* have two breaks on their circumference at equal distances from the wires *u v* and *u' v'*. The positive and negative electric currents

pass from battery *r* through wires. The former may be attached to the spring *m*, the latter to the spring *m'*. The positive electric current will pass from *m* to the ring *p* until it comes to the transverse wire *u*, when it will be transmitted to ring *q*, from there to spring *n*, and from thence to the bell-machine and the signal-boxes, and thence back by either a metallic or ground circuit to spring *n'* and ring *q'*, over the transverse wire to the spring *p'*, spring *m'*, and thence to the negative pole of the battery, thus completing the circuit.

By turning the cylinder *k* one-half a revolution the positive current will pass from ring *p*, through the insulated wire *v* underneath the ring *q*, to the ring *q'*, and thence to spring *n'* and to bell-machine and boxes, returning to ring *q*, and, passing to ring *p'*, returns through spring *m'* to the other pole of the battery. On completing the revolution of the cylinder, the circuit is again reversed and brought to its normal or first condition. By this arrangement I am enabled to dispense with an independent wire or circuit, which has heretofore been found necessary to operate the bell-tower

machine, and hence saving nearly one-half the amount of wire which has been used in making fire-alarm telegraphs, together with all incidental expenses contingent on the same, such as repairs, renewal, and extra labor employed.

What I claim as new, and desire to secure by Letters Patent, is—

1. The employment of reverse currents for operating the bell-striking mechanism, in the manner and for the purpose specified.

2. I claim successively engaging and disengaging the arms *b b'* of a bent lever attached to the weighted shaft of the bell-striking mechanism by the movement of a magnetized armature, which, by means of reverse currents, is caused to oscillate between two electro-magnets, in the manner set forth.

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

JOSEPH B. STEARNS.

Witnesses:

JOS. H. ADAMS,
M. S. G. WILDE.