

C. H. HASKINS.

Improvement in Combined Telegraph-Sounder and Relay.

No. 130,426.

Patented Aug. 13, 1872.

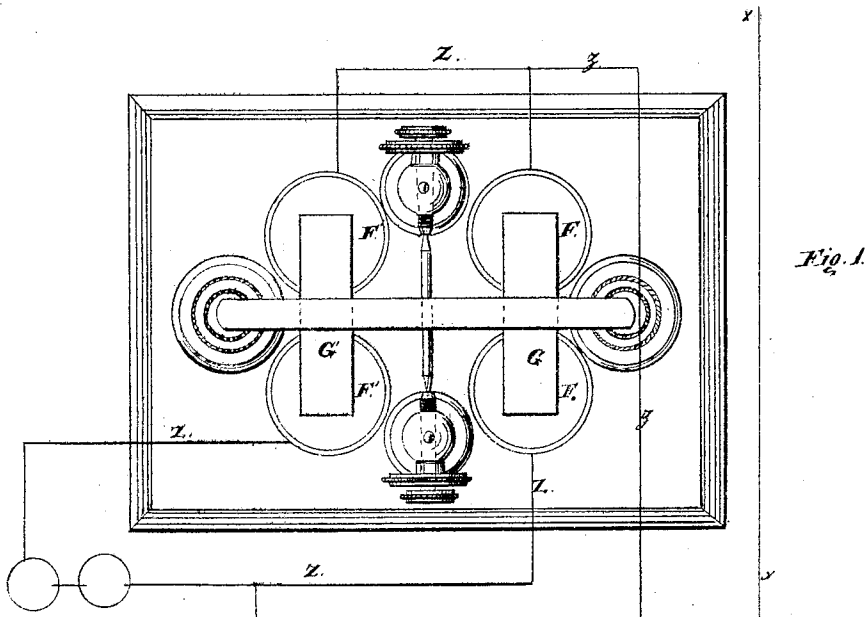


Fig. 1.

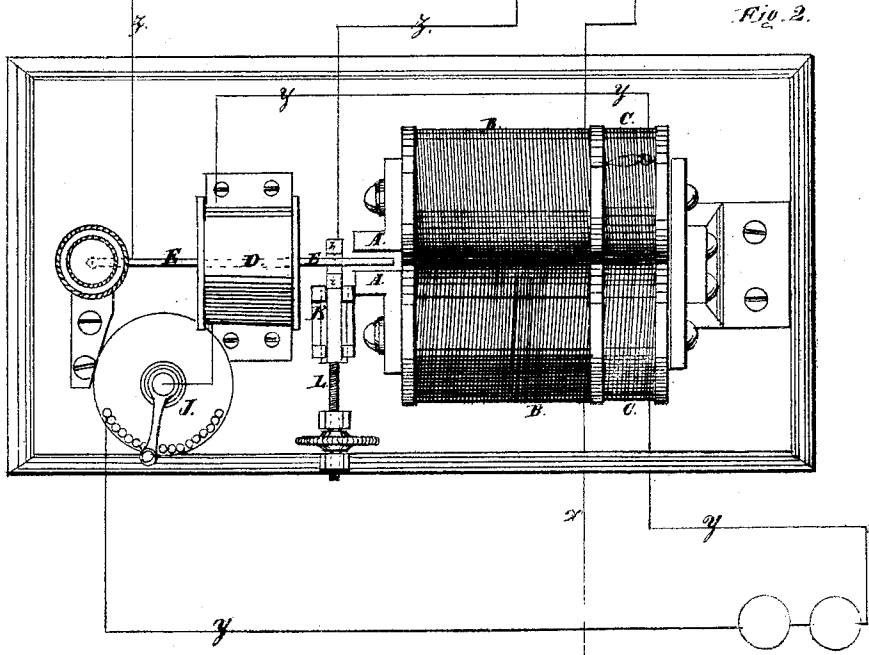


Fig. 2.

Witnesses:

*Henry F. Rosen*  
*[Signature]*

Inventor:

Charles H. Haskins  
 by Coburn & Munday  
 his Attorneys

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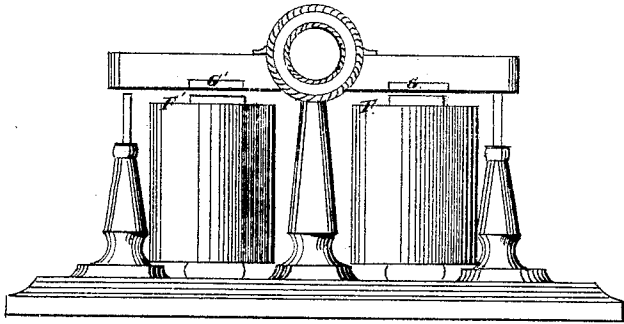


Fig. 3.

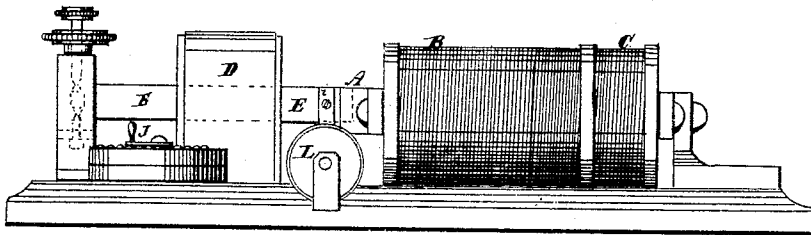


Fig. 4.

Witnesses:

Wm. F. Rogers.  
Geo. J. S. S. S.

Inventor:

Charles H. Haskins  
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# UNITED STATES PATENT OFFICE.

CHARLES H. HASKINS, OF MILWAUKEE, WISCONSIN.

## IMPROVEMENT IN COMBINED TELEGRAPH SOUNDERS AND RELAYS.

Specification forming part of Letters Patent No. 130,426, dated August 13, 1872.

Specification describing certain Improvements in Telegraph-Instruments, invented by CHARLES H. HASKINS, of Milwaukee, in the county of Milwaukee and State of Wisconsin.

### *Nature of the Invention.*

This invention consists in winding the cores of the main circuit electro-magnet with a helix connected with the main circuit, and a helix of less power connected with a local circuit, in such manner that the two circuits polarize the core in opposite directions, in connection with an armature polarized by the same or another local circuit, in such manner that the free end of the armature, which vibrates between the poles of the magnet, is impelled toward the one pole when the local circuit is acting alone upon the magnet, and toward the other pole when the main circuit is sent through the stronger helix, by means of which action of the armature a second independent local circuit, connected to a pair of magnets with helices of unequal power and armatures carried upon opposite ends or sides of a pivoted lever, is caused to shunt the stronger helix of said pair of magnets when the main circuit is passing, and allow the weaker helix and its magnet to bring down its armature and sound or register the signal, as will be hereinafter more fully explained.

In the accompanying drawing which forms a part of this specification, Figure 1 is a top or plan view of the sounder. Fig. 2 is a similar view of the relay. These two are shown connected by the wires of the proper circuit. Fig. 3 is a side elevation of the sounder. Fig. 4 is a side elevation of the relay.

Like letters of reference made use of in the several figures indicate like parts.

To enable those skilled in the art to make and use my invention, I will proceed to describe the same with particularity, making use, in so doing, of the aforesaid drawing by letters of reference thereto.

### *General Description.*

A A' are the two poles of the relay electro-magnet, surrounded by the helices B B connected to the main circuit X. C C are also helices of a less resistance or number of convolutions, wound upon the same core, and connected to a local circuit, Y, which also passes

in a helix, D, around the armature E, so placed as to vibrate between the poles A A'. The circuit Y is a constant circuit, and never broken, while the main circuit X is, of course, broken and connected at every signal, so that the action of the helices B of the main circuit X is intermittent, and the action of the local circuit Y upon the same core constant. These helices B and C are so arranged or wound and connected in their several circuits as to polarize the core in opposite directions; but the helices B, being the strongest, overbalance the helices C when the main circuit is closed, and govern the polarity of the core, and when the main circuit is broken the helices C resume their then undivided sway, and reverse the polarity of said cores, so that the core remains always a magnet the polarity of which is reversed each time the main circuit is completed or broken. The helix D surrounding the soft-iron armature E being connected with the permanent local circuit Y, keeps said armature constantly polarized in one direction, so that when the local circuit Y has possession of the core the free end of said armature is attracted by one of the poles (say A) and repelled by the other, (say A') and being free to vibrate in a limited arc, assumes the nearest place to the pole toward which it is attracted. Now, when the main circuit is closed and the superior force of the helices B brought to bear and the polarity of the cores changed, the armature vibrates toward the other pole, (say A'.) F F' are two electro-magnets surrounded by helices of unequal strength, (or number of convolutions or amount of resistance,) with their armatures G G' carried upon the opposite ends or sides of a pivoted lever, H, so that when one armature is attracted by its magnet the other must be moved away from its magnet. Of these magnets, F, is made the strongest when the circuit passes through both, and consequently its armature G overbalances the armature G', and, moving toward its magnet, removes G' a corresponding distance. In this position the armatures remain so long as the current of the constant local circuit Z passes through both magnets. If, however, the local circuit Z is shunted by the magnet F and sent through the magnet F' alone, then the last-mentioned magnet becomes the stronger, and

reverses the position of the armatures. A shunt-wire, *z*, is connected in the local circuit *Z* and to the armature *E* of the relay and to a point, *h*, in the path of said armature's vibration, so that when the main circuit is closed to send a signal and the helices *B* govern and change the polarity of the core of the relay magnet, the said armature is thereby brought in contact with the point *h*, the local circuit *Z*, on account of the superior resistance in its path through the helix of the magnet *F*, avoids said magnet and courses through the shunt-wire, causing the local circuit *Z* to pass through the helix of the magnet *F'* attracting its armature *G'* and producing the down stroke of the signal, the back stroke of which is produced by the reaction of the armature when the circuit is again allowed to pass through both magnets *F F'*.

In the drawing this part of the invention is shown as a sounder, but it will be readily understood that the same mechanism may be adapted to a register. It will also be apparent that the soft-iron armature *E* of the relay may be replaced by a permanent steel magnet, dispensing thereby with the helix *D*; but I prefer to use the soft-iron armature and helix because a steel magnet is uncertain in perpetuity of effect and likely in such a position to lose its polarity, while the strength of the soft-iron magnet may be regulated and the electro-magnetism being induced by the same current *Y* as surrounds the cores, is comparatively unaffected by location and operation, and always relatively the same. *J* is a common rheostat or series of resistance-coils connected to a switch-lever in the local circuit *Y*, so that the resistance of said circuit may be graduated if occasion demands, as in case the local current is found to act too powerfully as compared to the main circuit under all circumstances, or varying circumstances. The extent of vibration of the armature *E* is always the same between the fixed points *h i*, which are placed as near together as the mechanism will admit consistent with decided and distinct vibration. Said points *h i* are connected to a sliding carriage, *K*, operated by means of a screw, *L*, to move transversely and carry the armature to-

ward one pole or the other of the magnet without changing the amount or extent of the vibration of said armature. By this simple means the relative force of the two circuits upon the armature may be governed by simply moving the slide to one side or the other until the apparatus gives a satisfactory operation, while the vibration or extent of motion of the armature remains unchanged and at the most advantageous quantity.

#### Claims.

Having thus fully described the construction and operation of my invention, what I claim and desire to secure by Letters Patent, is—

1. The employment, in connection with the core of a main-circuit electro-magnet, of a constant local circuit of less power upon the core than the main circuit, which constantly magnetizes the armature and core of said magnet, substantially as specified.
2. The combination of the main circuit-magnet armature with a device for bringing it nearer to one or other of the poles of the magnet without changing the extent of the vibration of said armature.
3. The combination in a telegraph-sounder or register of two armatures borne upon opposite ends or sides of a pivoted lever, with two electro-magnets of unequal resistance or number of convolutions, operated by the same circuit, and a device for shunting the circuit from the stronger magnet.
4. The combination upon a single core of two helices of unequal power, connected in separate circuits in such manner that they polarize said core in opposite directions.
5. The combination of the main circuit *X* and helices *B*, local circuit *Y* and helices *C D*, the core *A A'*, armature *E*, the magnets *F F'*, armatures *G G'*, borne upon a pivoted lever, the local circuit *Z* and shunt *z*, substantially as specified.

CH. H. HASKINS.

Witnesses:

A. WELLER,  
W. J. RULISON.