(No Model.)

H. G. FISKE.

Electric Signal Apparatus.

No. 229,990. Patented July 13, 1880.

Fig. 1.

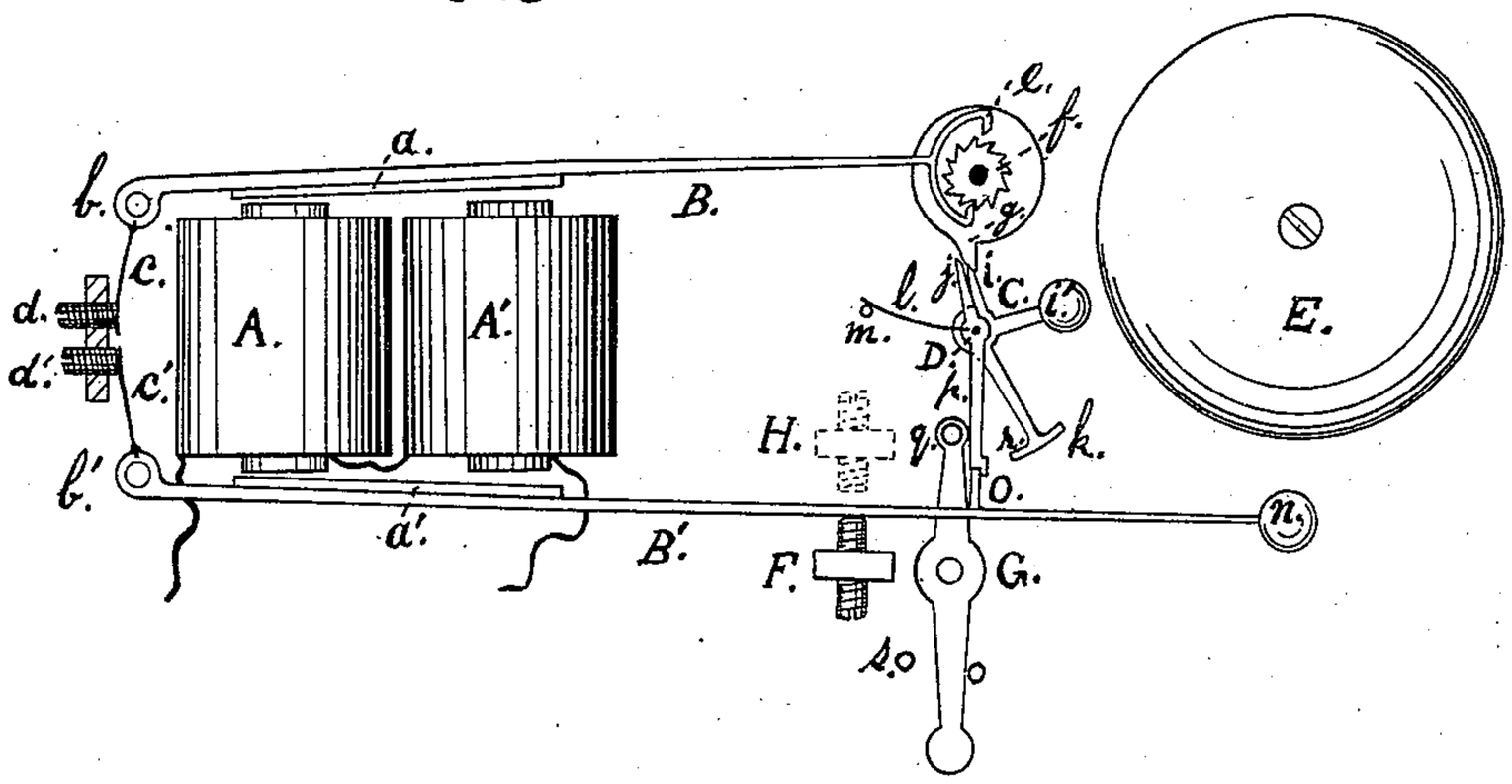


Fig. 2.

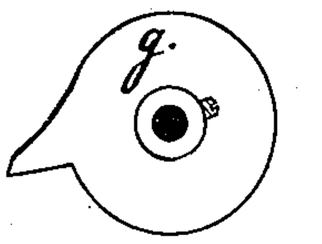


Fig. 3.

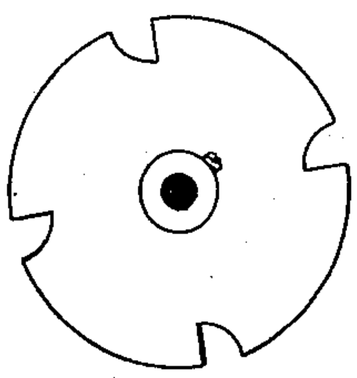
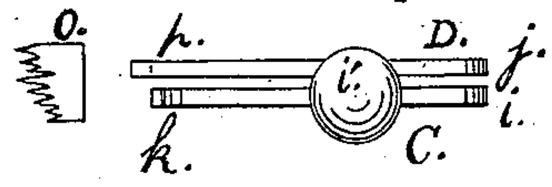


Fig. 4.



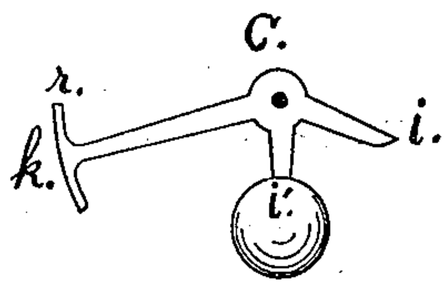


Fig. 5.

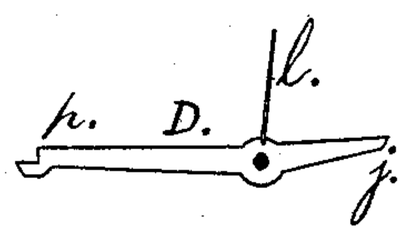


Fig. 6.

Witnesses;

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W. E. Chaffee

Inventor;

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UNITED STATES PATENT OFFICE.

HENRY G. FISKE, OF SPRINGFIELD, MASSACHUSETTS.

ELECTRIC SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 229,990, dated July 13, 1880.

Application filed March 9, 1880. (No model.)

To all whom it may concern:

Be it known that I, HENRY G. FISKE, of Springfield, Massachusetts, have invented new and useful Electric Signal Apparatus, of which the following is a specification.

My invention relates to improvements in electric signal apparatus in which electro-magnetic ratchets are employed to locate the point at which the signal is to be sounded; and its object is to avoid signaling at all points on telephone and telegraph lines except at the point or points desired.

The nature of the invention consists in adapting the striker or hammer of an electro-magnetic call or bell to be locked and unlocked by the aid of electricity and an electro-magnetic ratchet operating a trip with which to move a bolt or locking-lever; also, in providing the same with a means to prevent instantaneous operation of the hammer for the purpose of adapting the hammer to be operated slowly or rapidly; and also in providing a means to adapt the hammer to be unlocked independently of the ratchet operation.

In the drawings, Figure 1 is a plan view of an electro-magnetic call-bell and an electro-magnetic ratchet having my invention applied to the same. Fig. 2 is an enlarged view of the trip employed in the above. Fig. 3 shows another form of trip that may be employed, and is shown adapted to release locking lever or levers four times to one revolution. Fig. 4 is a side view of the first and second locking-levers with the weight on the latter, and shows a section of the strip which is attached to the bell-hammer lever, by the aid of which the levers lock the hammer. Fig. 5 is an enlarged plan view of the second lever, and Fig. 6 is a similar view of the first lever, and is the most important one of the two.

Similar letters refer to like parts throughout the several views.

The bar electro-magnets A A′ are of the ordinary construction, and the wire with which they are wound is joined, as in a horseshoe electro-magnet. These coils should be secured firmly in place; but these and several other parts are not shown secured, that the drawings may be more distinct in the more important details.

The armatures *a a′* are also of the ordinary construction, and are secured lengthwise to the levers B B′, which are pivoted at *b b′* and pressed away from A A′ by the aid of the springs *c c′* and their adjusting-screws *d d′*. These springs are adjusted to different tensions, *c* being much more rigid than *c′*, and is so adjusted to enable the lever B′ to be operated with the aid of finely-divided electrical impulses or weak slow ones without operating the lever B.

The lever B carries a ratchet-pawl, *e*, at its outer end, which is preferably so adjusted as to revolve the ratchet-wheel *f* to the greatest extent while returning into the position shown, which I shall explain more fully hereinafter.

The ratchet-wheel is arranged to revolve a shaft which carries with it a trip, *g*, arranged to first trip the pivoted and weighted lever C at *i*, and immediately afterward to raise the pivoted lever D at *j*, overcoming the power exerted by the spring *l*, resting against the pin *m*, and accomplishing this at such a time as shall have given the arm *k* of the released weighted lever C time to swing upward in front of the strip O on the lever B′, and the next movement of the trip will have permitted the lever D to be released and to return to its place of rest.

The lever B′ has secured to it at its extreme outer end the hammer *n*, near which is secured the bell E, and about midway of the lever is arranged an adjustable stop, F, which regulates the backward movement of the said lever. The strip O secured to the said lever is arranged to come in contact with the arm *p* of the lever D, as shown, and so enable said arm to lock the bell-hammer lever B′ near to or against the stop F, also shown, and the arm *k* of the lever C, when at its point of rest, will enable the part marked *r* to just clear O, so that when the arm *p* of D is thrown to one side O will have free play over the arm *k*. The overlapping of *p* upon the side of O may be dispensed with by providing any suitable means to stop it at the right point to catch O.

The lever G is pivoted near its center, and is provided with a projection at *q*, by the aid of which to move the lever D away from O and enable the bell-hammer to be unlocked by hand.

The operation is as follows: As an illustra-

tion, suppose a telephone-line has a main office and twelve stations upon it, now insert one of the above instruments into the circuit at each station, securing it in a perpendicular position with the bell downward, and in connection with each instrument arrange a simple circuit-breaking key and set the trip and ratchet-wheel of each instrument in a different relative position, which may be done by operating the ratchet by hand, having made the necessary connections with the line. Now at the main office insert into that circuit an electro-magnetic ratchet having a dial and pointer, and the ratchet-wheel of which has twelve teeth, as do also those at the stations, and the dial will, of course, have the same number of spaces, making one for each station, and may have the several names or numbers applied to it. This office will also require a suitable break-piece to enable it to send both slow and rapid electrical impulses over the line, and also an electric signal or call bell of some kind, which will attract the operator's attention when a call is being made from one of the stations. The electric connections now being made, the operator wishes to call No. 10, He looks at the dial and finds the pointer to indicate, say, No. 6. He immediately opens and closes the circuit four times, and the ratchets all through the line are thus operated and turn the ratchet-wheels *f* four teeth forward, carrying with them the trip *g* at each station, and that at No. 10 will then be in the position shown in Fig. 1, but of course the lever B would then be standing forward toward the magnet instead of away from it, as shown in the drawings.

I have stated that the ratchet-lever B does the greater part of its work upon being released from the magnet, and it is for the purpose of avoiding all pressure of the lever B′, and with it the strip O, upon the outer end of the arm *p* of the lever D while the trip is operating, and also to obtain considerable length to a single movement of the trip *g* for the purpose of first tripping the lever C and then raising the end *j* of D at such a time that the former will be found to have swung upward by the force of the momentum it acquired upon being tripped, so that the arm *k* will for the instant be found directly in front of the strip O, which was the case in each instrument at the stations just passed, and as the breaks in the circuit are supposed to have been made fairly regular and moderately fast, and as each successive lever D released O the arm *k* of C prevented the bell-hammer *n* from acting for the instant, and the strip O held up *k* by the pressure which was exerted upon its armature *a′* until the next break in the electric circuit, when the ratchet gave another turn and released the lever D, allowing it to return to its place, again locking B′, as at the start. But now the operator wishes to ring the bell at No. 10. The lever C is partially raised, as shown, so that when the circuit is again broken C will be tripped, and by aid of the momentum which the weight *i* acquires in descending it swings upward on the *k* side and brings the arm *k* directly in front of O just as the latter is being released by the trip *g* moving D. The operator now, instead of closing the electric circuit instantly, waits until C has come to a rest again, and by so doing the bell-hammer remains unlocked, and the operator may then send electrical impulses over the line slowly, if they are sufficiently weak to avoid operating the ratchets, and thus has the bell entirely under his control to strike slow or fast. Should he use electricity of the same strength to strike the bell and operate the ratchets, he should only attempt to use rapid and finely-divided electrical impulses with which to strike the bell; otherwise he is liable to operate the ratchets, and so lock the bell-hammer back in place. The main-office operator having now called No. 10 without disturbing any of the other stations, No. 10 now answers by breaking the circuit once or twice, and in so doing rings the signal-bell at the main office. This operation of breaking and closing the circuit has, of course, locked the bell-hammer at No. 10; but if the operator at this or any station wishes to make a call on the main office he simply turns the lever G to *s*, and by so doing brings *q* over against the arm *p*, thus unlocking the bell-hammer at his own station, and then he will manipulate his circuit-breaking key, which will cause the bell at the main office to be struck, and with it his own, and his bell will then be in a condition to receive the response from the main office without its being necessary for that office to employ the ratchet operation or any particular precaution in breaking the circuit.

If desired, the lever C may be dispensed with, provided a stop similar to that shown by the dotted line at H is employed to receive the thrust of the lever B′, and thus prevent actual contact of the hammer *n* with the bell E at a single forward movement; but this arrangement will enable the hammer to reach the bell by the momentum it acquires in vibrating rapidly, and so will be nearly as satisfactory as when the lever C is employed, but of course prevents employing slow weak electrical impulses, as the bell-hammer will not be able to reach the bell; or the stop H and lever C may both be dispensed with, provided a single stroke of the bell while the station is being passed is not objectionable. The lever D may also be provided with a weight similar to that of C, (marked *i′*,) and the spring *l* dispensed with.

It will be seen, also, that any desirable form of trip may be used having one or more tripping-points arranged upon it, and any of the well-known forms of ratchets may be employed to operate the trip; also, that the levers B B′ may be pivoted in any desirable manner, and may each have separate magnets, and the whole may be arranged on or in any suitable board or box, &c.

It will be seen from the foregoing that I

not only lock the bell-hammer and retain it from reaching the bell, but I lock the lever upon which the hammer is secured back against the stop F so effectually as to prevent the bell-hammer from moving at all with the exception of a slight tremulous motion scarcely perceptible to the eye, and I thus avoid the clicking sound which would otherwise occur at every break in the circuit.

The lever B′ may be sufficiently elastic between the locking-point and the pivot *b′* to enable the armature to be bent down toward, or even reach, the magnets A A′, provided the stop F or its equivalent is located directly opposite the locking-point.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of an electro-magnetic ratchet with the trip *g* and lever D, the whole being adapted to lock and unlock the hammer *n*, for the purposes herein substantially shown and described.

2. The combination of the trip *g* and lever D with the lever C, the former being adapted to lock and unlock the hammer *n*, and the latter to prevent instantaneous operation of the hammer, for the purposes herein shown and described.

3. The lever G, when adapted to mechanically unlock the hammer *n* by hand, substantially as shown and described.

HENRY G. FISKE.

Witnesses:

CHARLES WALTER,

C. INGLE.