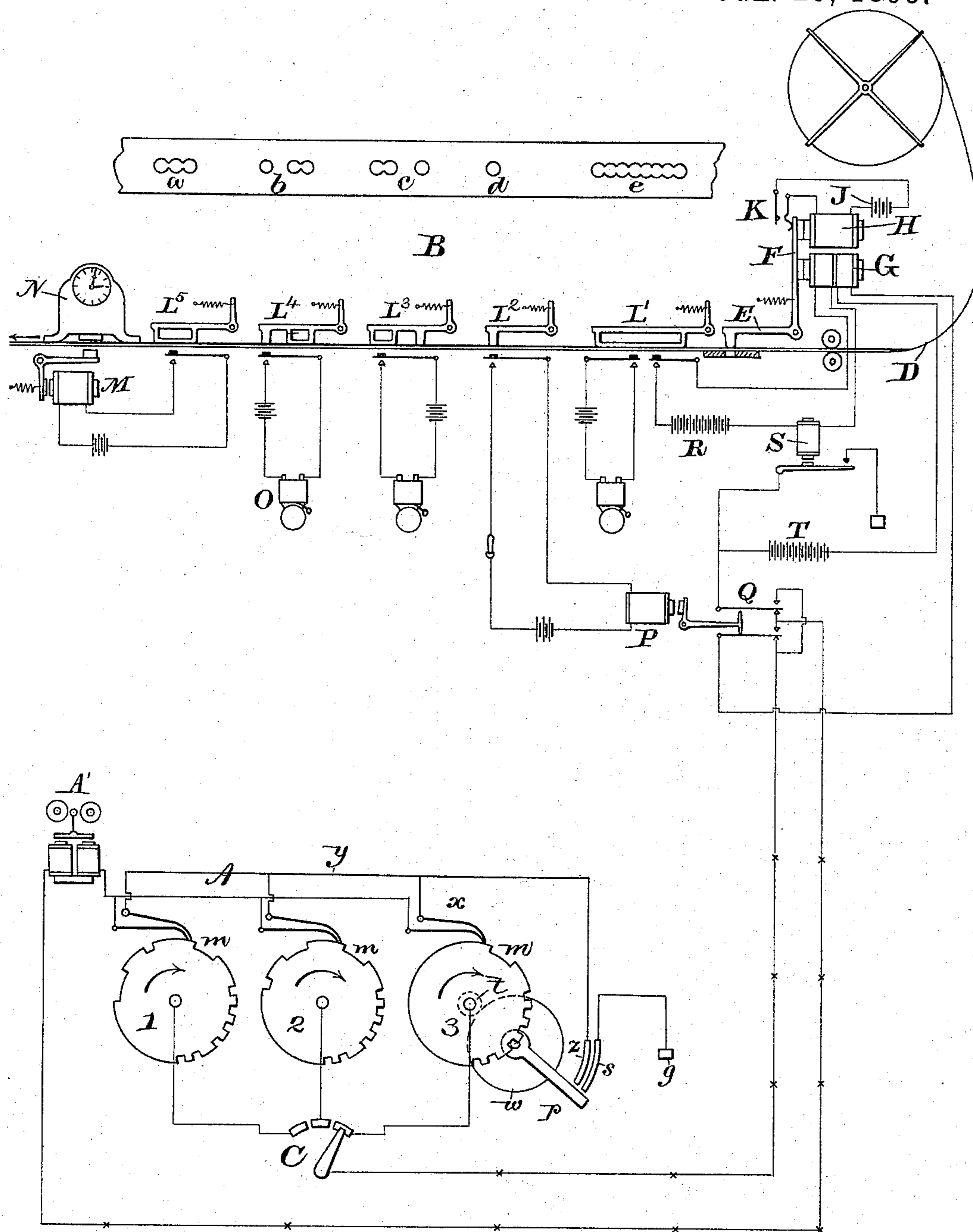


(No Model.)

F. A. TURNER.  
SIGNALING TELEGRAPH.

No. 533,254.

Patented Jan. 29, 1895.



WITNESSES

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St. J. Livermore

INVENTOR

Frank C. Turner

By Bentley + Blood gill

Ch. 1

# UNITED STATES PATENT OFFICE.

FRANK A. TURNER, OF CHELSEA, MASSACHUSETTS, ASSIGNOR TO THE GAMEWELL FIRE-ALARM TELEGRAPH COMPANY, OF NEW YORK, N. Y.

## SIGNALING-TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 533,254, dated January 29, 1895.

Application filed July 27, 1893. Serial No. 481,648. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK A. TURNER, a citizen of the United States, residing at Chelsea, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Signaling-Telegraphs, of which the following is a specification.

My invention relates, especially to signaling systems such as are used for police purposes, there being at the outlying signal boxes means by which signals of different kinds, or multiple signals, can be transmitted to the central station, where not only is indicated on the receiver the number of the box, but also the number of the officer sending the signal, or a call for an ambulance, a patrol wagon, or some other special signal which the transmitting apparatus is adapted to send.

My invention consists in devices to be placed at the central office to record the character of the signal which is received.

It is illustrated in the accompanying drawing, which is a diagrammatic representation of my apparatus.

In the drawing A represents a signal box and B the central station. At the former, provision of any suitable kind is made for sending signals of a distinct character. I have indicated this by showing three signal wheels with notches differently arranged so as to cause differing combinations of interruptions of the circuit by the differing lengths and spacings of such interruptions. A switch C is provided for bringing into circuit either one of these three wheels according to the character of the signal which it is desired to send. At the receiving station D is a strip of paper adapted to be drawn from a reel by clock work in a well known manner. This strip passes under a punch E which is operated by the armature lever F of the main line magnet G, being adapted whenever the said armature is released to be drawn back under the influence of its retractile spring and thus punch a single round hole in the strip D at each stroke. A second magnet H also controls the lever F being included at each retraction of armature F in the circuit of local battery J, by means of the circuit closer K actuated by the said armature.

It will be quite apparent that if the main

line magnet G should be entirely de-energized so as to exert no influence whatever upon lever F, the said lever would be left entirely under the control of magnet H, and would be kept constantly in vibration by the automatic operation of the circuit closer K, the result of such vibration being that a series of holes is punched in the strip D so close together as to overlap and form a single slotted hole in the paper. If, however, a single short break only is made in the main line, the punch E will make but one stroke. Now, it will be clear that the signal wheels at station A may be so cut as to give any combination of notches having any desired spacing and any desired length, and also that by the operation of the receiving device thus far described, the makes and breaks caused by any one signal wheel will be accurately reproduced in the punchings on strip D. Thus a single short break will give a single hole in the strip. An interval may follow of any desired length and then a longer break which will allow a slot to be punched in the strip corresponding to the length of such break. I utilize this arrangement in the following manner: The strip D is drawn along under a series of drops  $L^1, L^2, \&c.$ , each of which has its lower surface so shaped that it will drop into a special punching in the strip caused by a corresponding arrangement of notches on either one of the signal wheels, but will not fall into any other punching than its own. Thus for instance, it will be seen that each one of the signal wheels which are marked 1, 2, 3 have a long notch  $m$  which passes under the contact spring just before the wheel comes to rest in its normal position shown in the drawing. This notch  $m$  is so shaped that it will open the main circuit a sufficient length of time to permit three strokes of the punch E and this will make a slot in strip D of the form shown at  $a$  and the drop  $L^5$  is of such a length that it will drop through the slot  $a$  and thereby close the circuit of magnet M which controls the time-stamp N. Thus whichever signal wheel is operated, the last break would be of the length necessary to cause the operation of time-stamp N. In like manner the signal wheel 2 makes first a long break and then a short break. This will per-

mit two strokes of the punch and after a suitable space a second break will permit to be punched a slot of the form shown at *c* and the drop  $L^3$  is so shaped that it will enter the slot *c* and no other, and thereby close the circuit of the signal *O* which will give a special indication at the station corresponding to the special arrangement of notches on wheel 2. For instance, it may be arranged that this signal will be the one for a patrol wagon. In the same way signals of any kind can be sent by a suitable combination of the notches in the wheels and such signal will be indicated at the central station by the automatic selective action of the drops *L*.

I may, if it is so desired, use a drop of the shape  $L^2$  which will correspond to each short break in the circuit and this can be used to close the circuit of magnet *P* which will operate the pole-changer *Q* in the main line and thus send out an impulse of reversed current to actuate polarized bells in the several signal boxes and thus notify the officer sending the signal that his message has been received. The same arrangement can be used at times to notify the officer that he is wanted at the telephone.

Should the line become broken, the long slot will be punched in the manner indicated at *e* and this will permit the long drop  $L'$  to fall and close the circuit of a special alarm calling attention to the fact of the broken circuit, and also close the circuit of the local battery *R* through a section of the main magnet *G*. This will draw up armature lever *F* and stop the punching; while at the same time a magnet *S* in this circuit will establish a ground connection for the main line at the central station, the object of this being that the signals may still be received on a grounded circuit, for it is usually arranged at the signal boxes that one round of the signal shall establish a ground connection at each impulse and as there will be a corresponding ground at the central station, the main line circuit will be momentarily closed, and further as the main section of the winding on magnet *G* will be opposed to the second section in the circuit of battery *R*, and as the main battery *T* will be arranged to have the same force as battery *R*, magnet *G* will be de-energized at each impulse and its armature will act as though the signal were being received over the main line in the usual manner by breaks in the closed circuit.

The means for establishing during one round a ground connection at each impulse is shown at the signal box *A*. Supplementary contact springs *x, x, x* are in connection with the conductor *y* leading to an insulated contact plate *z*. A second insulated contact plate *s*, parallel to the first one, is connected to ground at *g*. Each signal wheel is provided with additional mechanism like that shown at 3. A small wheel *t*, rotating with wheel 3, is geared with a larger wheel *u*. The wheel *u* carries an arm *p* adapted to sweep

over the contact plates *z* and *s* and close the circuit between them. Assuming that four rotations of the wheel 3 complete a signal, the other wheels *t* and *u* are so proportioned that during four rotations of wheel 3 the contact arm *p* will close the circuit between *z* and *s* during one of the said four rotations and thus establish a connection between conductor *y* and the ground. The establishing of the ground circuit is so timed that it will occur either at the beginning or end of the signal.

*A'* is a polarized bell adapted to respond to reversals of the current by means of the pole changer *Q*, whenever the same is operated by the magnet *P* upon the closing of the local circuit by the drop  $L^2$ .

It will be obvious that without departing from the spirit of my invention, I may introduce various modifications, it being especially understood that I do not limit myself to the forms of punching shown, but that any desired combinations corresponding to any system of special signals may be utilized.

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

1. In a signaling system the combination of one or more transmitters each adapted to send signals of various kinds, of a receiving apparatus consisting of a strip of paper, a device for punching said paper in accordance with the character of the respective signals, and a series of indicators at the receiving station corresponding individually to the respective signals, the said indicators being respectively controlled by the corresponding perforations in the said strip.

2. In a signaling system the combination of one or more transmitters each adapted to send signals of various kinds, of a receiving apparatus consisting of a strip of paper, a device for punching said paper in accordance with the character of the respective signals, and a series of circuit controllers at the receiving station corresponding individually to the respective signals controlled by the said strip.

3. In a receiving apparatus for a signaling system, the combination with a strip, of a punch, a normally inactive magnet in a local circuit for operating said punch when the main line is broken, a main line circuit normally closed, and a second magnet in the main line for independently operating said punch, but controlling said first magnet when the main line is broken.

4. In a receiving apparatus for a signaling system, the combination with a single strip of means for punching the same in correspondence with the character of the signal received, a series of differently shaped drops corresponding to the respective punchings and adapted to enter the punched portion of the strip and thereby indicate the character of the signal received.

5. A receiving instrument for a signaling system consisting of a strip, a punch adapted to act continuously during a break in the main line and a drop adapted to enter the per-

foration in the strip caused by continuous punching, and a stop for the punching controlled by the falling of said drop to interrupt the operation of the punch.

5 6. In a receiver for a signaling system, the combination of a strip, of a punch adapted to act continuously during a break in the circuit, of a drop adapted to enter the perforation in the strip caused by continuous punching, corresponding to an accidental break in  
10 the circuit, a local circuit controlling the said punch, a ground connection for the main line, and a device for sending a signal over the grounded circuit.

15 7. In a receiver for a signaling system, the combination of the main line magnet having two windings, one included in the main line, and the other in a local circuit, a punch for acting continuously during the break in the  
20 main line, a circuit closer, and a local circuit and ground connection controlled by the perforation in the strip caused by an accidental break in the main line.

25 8. In a receiver for a signaling system having a transmitter for producing changes in the main line and a local circuit in which changes are produced by a break in the main line, the combination of a strip, a punch normally operated by a magnet in the main line  
30 and by a magnet in said local circuit when the main line is broken, a series of differently shaped drops corresponding to the punchings caused by said changes in said main and local

circuits respectively, a series of local circuits controlled by said drops, and electrical apparatus in each of said local circuits. 35

9. In a receiver for a signaling system having a transmitter for producing changes in the main line and a local circuit in which changes are produced by a break in the main  
40 line, the combination of a strip, a punch normally operated by a magnet in the main line and by a magnet in said local circuit when the main line is broken, a series of differently shaped drops corresponding to the punchings  
45 caused by said changes in said main and local circuits respectively, and a pole changer in a local circuit controlled by one of said drops for reversing the polarity of the main line.

10. In a receiver for a signaling system, 50 the combination of a punch adapted to operate continuously during a break in the main line, of a device for sending different signals over the main line, each signal consisting of a special combination of open and closed circuit periods, and a series of drops shaped to  
55 enter special perforations caused by the special signals and thereby operate the corresponding signal indicators.

In witness whereof I have hereunto set my hand this 3d day of July, 1893. 60

FRANK A. TURNER.

Witnesses:

A. O. ORNE,

A. A. MCBRIDE.