

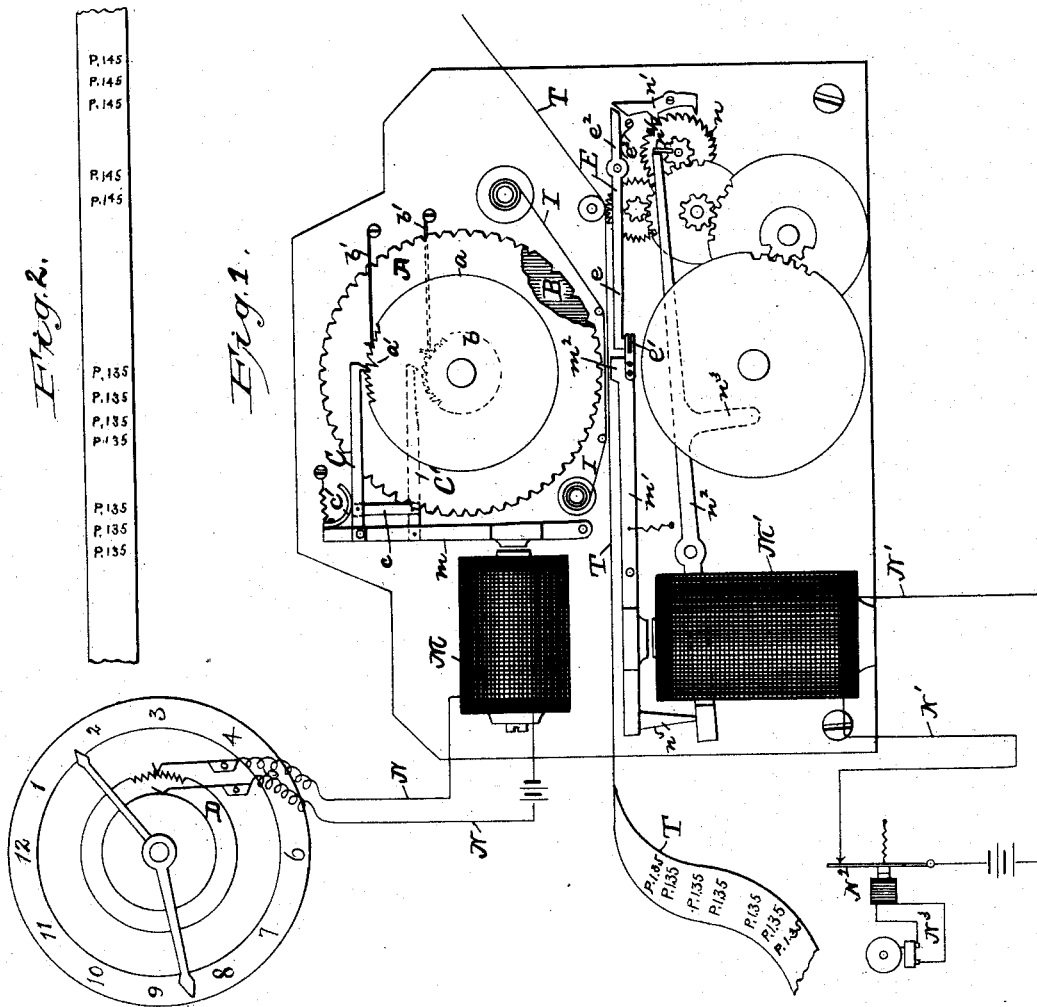
(No Model.)

F. B. WOOD.

METHOD OF ELECTRICALLY RECORDING SIGNALS.

No. 420,851.

Patented Feb. 4, 1890.



**WITNESSES:**

Wm. Benjamin  
of T. T. Paley.

INVENTOR

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His ATTORNEY

# UNITED STATES PATENT OFFICE.

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## METHOD OF ELECTRICALLY RECORDING SIGNALS.

SPECIFICATION forming part of Letters Patent No. 420,851, dated February 4, 1890.

Application filed May 14, 1889. Serial No. 310,782. (No model.)

### *To all whom it may concern:*

Be it known that I, FRANK B. WOOD, of the city, county, and State of New York, a citizen of the United States, have invented an Improved Method of Electrically Recording Signals, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to the recording or printing upon the tape or equivalent signal-receiving medium of an electrical recording-instrument of signals or signs; and my invention consists in the method of thus recording or printing signals which consists in recording or imprinting upon such tape or medium the signs or figures indicating the time at or about which the signal is received and recorded, singly or in repetition, in the succession and order to represent by the impressions thus made the number of the signal given, transmitted, and recorded.

Figure 1 is an elevation of an electrical recording-instrument for carrying out my invention, and Fig. 2 is a plan or face view of a recording tape or medium bearing signals imprinted thereon in accordance with my invention.

In carrying out my invention I imprint upon the recording tape or medium in an electrical recording-instrument the signs or figures indicating the time at or about which the signal is received and recorded, and I imprint such signs or figures in the succession and order or groupings which shall correspond to and represent the number of the signal received. For example, if the signal "34" is received at one o'clock and thirty-five minutes in the afternoon, I imprint the sign and figures "P. 1.35" three times in succession, constituting a group of three impressions, and then after a separating-space four times in succession, constituting a separate group of four impressions, so that the said three impressions and four impressions correspond to and indicate thirty-four, which is in this case the number of the said signal. In like manner, if the signal "23" is received at one o'clock and forty-five minutes in the afternoon, I imprint the sign and figures

"P. 1.45" twice in succession, constituting a group of two impressions, and then after a separating-space thrice in succession, constituting a group of three impressions, so that the said two impressions and three impressions correspond to and indicate twenty-three, which is in this case the number of the signal given.

It is evident that by making repeated and grouped impressions on the recording-tape of the signs and figures indicating the time when a signal is received and recorded I may record the number of any signal, and at the same time indicate as part of the record of the signal itself the hour and minute at or about which the signal is received and recorded. By means of my said method I am enabled to record the signal and the time of its reception and recording simultaneously, and by the imprinting upon the tape of only the succession of impressions indicating the signal-number. I am thus enabled to dispense with the printing of two separate and distinct sets of impressions on the tape—namely, one set indicating the signal and another set or single impression indicating the time, as is now done in electrically recording signals and the time of their reception and recording.

To effect the printing of the signal in accordance with my described method, the instrument shown in Fig. 1 may be employed. In this instrument the time indicating or registering mechanism comprises a minute-wheel A, having upon its periphery divisional faces equal in number to the intervals during an hour which it is desired to indicate upon the recording-tape T. In the drawings, this wheel is shown with sixty divisional faces—one for each minute of an hour. In like manner the divisional faces may be of such number as to indicate intervals of five, ten, fifteen, or other number of minutes.

B is an hour-wheel, having twenty-four divisional faces upon its periphery—one for each hour of a day. The faces of the wheels A and B bear in succession the index-type indicating, respectively, the number of the minute and hour and distinguishing the ante-meridian and post-meridian hours. These

wheels are mounted to rotate on a common shaft and each has fixed to it a ratchet  $a$ ,  $b$ , respectively, said ratchets having each the number of peripheral teeth corresponding to the number of peripheral faces on their respective wheels A B.

On the periphery of the ratchet  $a$  is the deep notch  $a'$  immediately beyond the tooth thereon, which is in line with the peripheral face of wheel A, indicating the final minutes of the series or succession thereon, said face being also in line with one of the faces of the hour-wheel B. The ratchets are controlled by spring-detents  $b'$ , as shown.

C and C' are pawls to the ratchets  $a$  and  $b$ , respectively, and are pivoted independently to the armature  $m$  of a magnet M, and are pivotally united by a link  $c$ , which is of such a length that when the pawl C is riding the ratchet  $a$  the pawl C' will be held free of engagement with the ratchet  $b$  until pawl C enters the notch  $a'$  on ratchet  $a$ , when such movement of said pawl will permit pawl C' to engage a tooth on ratchet  $b$ . The pawls are preferably pressed to engagement with their ratchets by a spring  $c'$ , as shown.

The magnet M is in a local circuit N with a time-piece, as shown, which is provided with a circuit-closing wheel D of an ordinary pattern, having a number of peripheral contact-points equal to the number of teeth on ratchet  $a$ . As the circuit N is closed at intervals by the wheel D in the time-piece, the vibration of the armature  $m$  will cause the pawl C to rotate the wheel A the distance of one of its peripheral faces, and in like manner when the pawl C enters the notch  $a'$  on ratchet  $a$ , which it will do at the end of each complete revolution of wheel A, the vibration of the armature  $m$  will, by the consequent engagement of the pawl C' with ratchet  $b$ , cause the rotation of both the wheels A and B the distance of one of the divisional faces on the periphery of each. The sums of the rotations of the wheel A will thus be indicated on the wheel B, so that the faces of the two wheels which are in line with each other immediately above the recording-tape may indicate the hour and interval or minute of the succeeding hour in correspondence with the time-piece.

In constructing the ratchets  $a$  and  $b$  they are given such relative diameters that while each ratchet bears the number of teeth described the teeth upon both ratchets will be of the same or equal length or pitch.

I is an inking-ribbon interposed between the time-wheels and the recording-tape, and  $m'$  is the armature carrying the printing-pad  $m^2$ , serving to carry the tape against the peripheral faces of said wheels in printing.

The well-known devices common in Morse registers may be employed to actuate the armature  $m'$  and move the recording-tape—namely, a clock-work train, as shown, having

an escapement  $n$  and its pallet  $n'$ , a friction-lever  $n^2$ , with its arm  $n^3$ , bearing against the face of the drum of the clock-train and engaging a stop-pin  $n^4$  on the escapement-shaft, together with a magnet M' in a local circuit N', which is closed by a relay N<sup>2</sup> when a signal is transmitted from the main-line circuit N<sup>3</sup>, and an arm  $n^5$  on the armature  $m'$ , which engages the friction-lever  $n^2$  and oscillates it to release the stop-pin when said local circuit N' is closed.

To check the movement or feed of the tape after the pin  $n^4$  has been released, and while the signal is coming in, so that the vibrations of the armature  $m'$  may effect the proper printing of the signal from the time-wheel faces upon the tape, I employ a lever E, one arm  $e$  of which is pivotally attached to an arm or extension on the armature  $m'$  by a pin  $e'$ , working in a slot in said arm, as shown, and the other arm  $e^2$  of which is adapted to engage the heel of the pallet  $n'$  when the said armature is vibrated to effect the printing.

A spring  $e^3$  may be employed to assist in lifting the arm  $e^2$  from engagement with the pallet  $n'$  when the armature is retracted on the opening of the circuit.

It is evident that at each vibration of the armature  $m'$  on the closing of circuit N' during the passage of a signal from the main line the lever E will engage the pallet  $n'$ , and thus check the feed of the tape T at the instant that such vibration of said armature carries the printing-pad to the periphery of the time-wheels, and that at each succeeding retraction of said armature, and so long as the circuit is open, the lever E will disengage the said pallet, and therefore permit the tape to move or feed. By this means the number of impressions of the index-type on the time-wheels made upon the recording-tape will correspond to and be in such succession and groups as will represent the number of the signal sent in from the main line.

The time-wheels A and B and their described ratchets and operating-pawls are not claimed as novel herein, but are more fully described and made the subject-matter of claims in a separate application for patent filed simultaneously herewith, Serial No. 310,110, filed May 9, 1889.

Any other known and equivalent time indicating and recording devices than said wheels A and B and their said actuating mechanism may be employed in connection with the signal-printing mechanism herein described in carrying out the primary feature of my invention, as herein set forth.

Furthermore, I do not claim herein the novel features in the mechanism herein shown and described by which I effect the recording of a signal in accordance with my invention; but I reserve the same and make

them the subject-matter of a separate application for Letters Patent, filed the 23d day of September, 1889, Serial No. 324,733.

What I claim as my invention, and desire to  
5 secure by Letters Patent, is—

The method of electrically recording signals, which consists in imprinting upon a recording medium the figures indicating the time at or about which the signal is recorded

in a succession of impressions corresponding to in number and relative location to and representing the number of the signal, substantially as and for the purpose set forth.

FRANK B. WOOD.

Witnesses:

MILES W. GOODYEAR,  
ARDEN S. FITCH.