

No. 652,754.

Patented July 3, 1900.

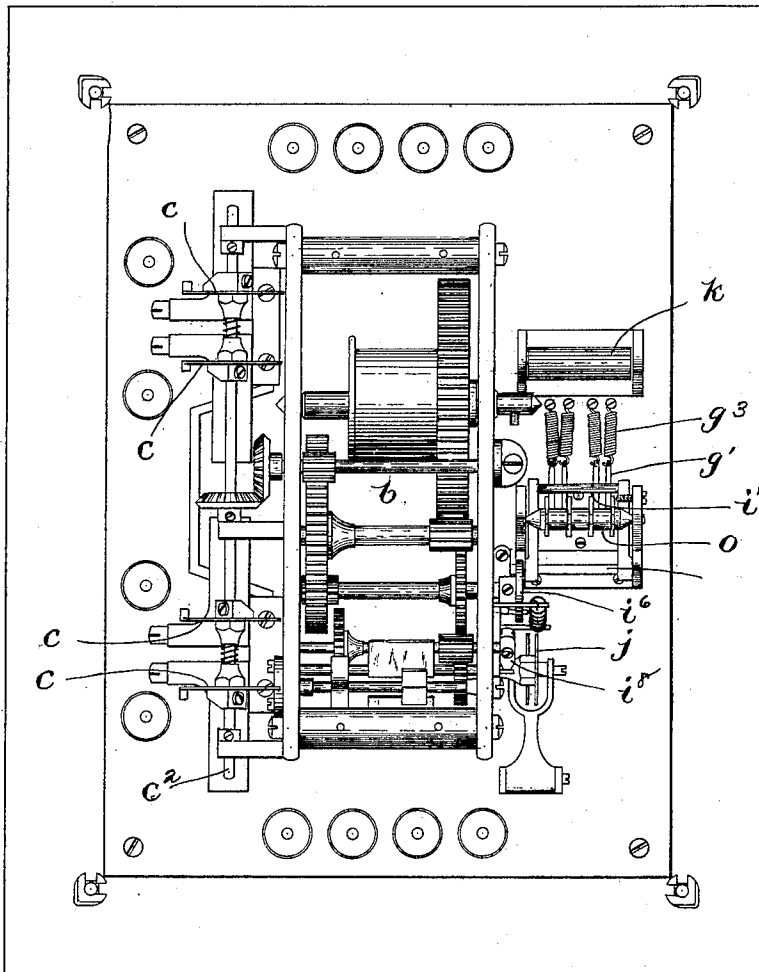
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REGISTER.

(Application filed June 24, 1899.)

(No Model.)

3 Sheets—Sheet 1.

FIG. 1.



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3 Sheets—Sheet 2.

FIG. 2.

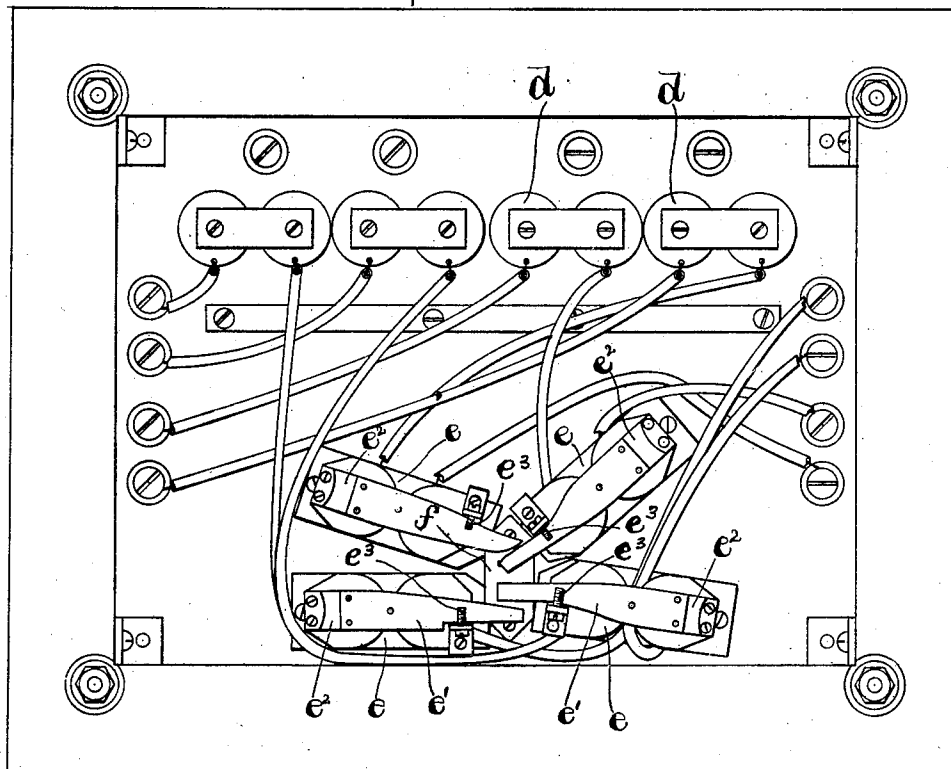
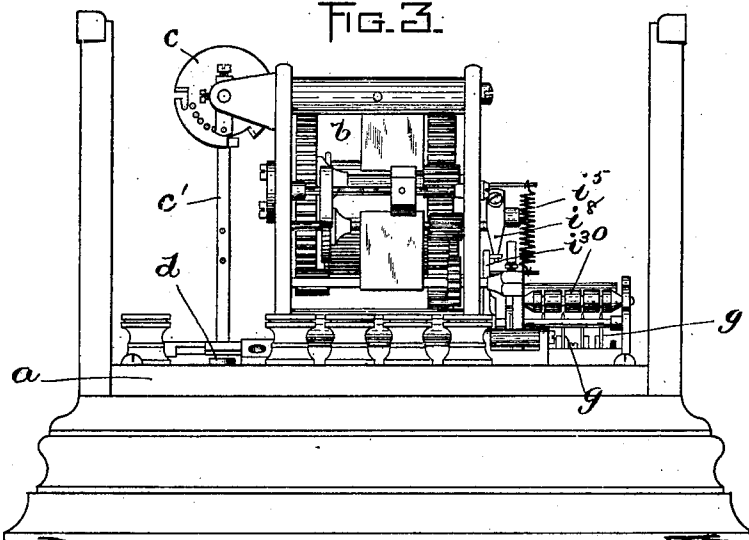


FIG. 3.



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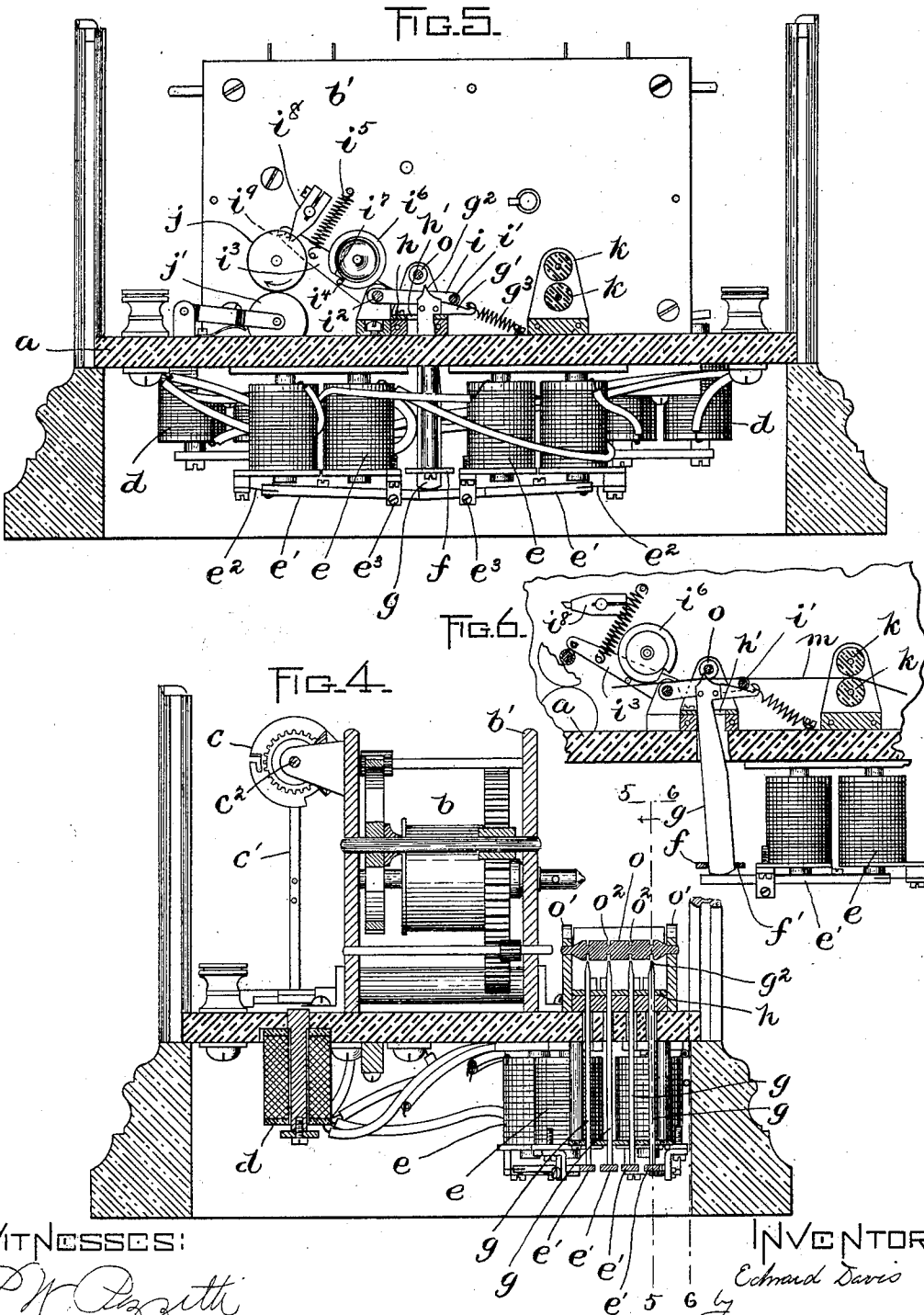
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

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REGISTER.

SPECIFICATION forming part of Letters Patent No. 652,754, dated July 3, 1900.

Application filed June 24, 1899. Serial No. 721,681. (No model.)

To all whom it may concern:

Be it known that I, EDWARD DAVIS, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Registers, of which the following is a specification.

This invention relates to devices for recording a message on the tape or record-strip of a register, such as the registers or receiving instruments employed in municipal signaling and other systems.

The invention involves the use of a perforating-punch in place of the marking devices ordinarily employed heretofore; and it consists in the novel features of construction and arrangement which I shall now proceed to describe and claim.

Of the accompanying drawings, Figure 1 represents a top plan view of a register constructed in accordance with my invention. Fig. 2 represents a reverse plan view thereof. Fig. 3 represents an end elevation. Fig. 4 represents a transverse vertical section thereof. Fig. 5 represents a section on the line 5 5 of Fig. 4. Fig. 6 represents a detail section on the line 6 6 of Fig. 4.

The same reference characters indicate the same parts in all the figures.

Referring to the drawings, *a* designates a flat base composed of a suitable insulating material, such as hard rubber, and *b'* designates a metal frame mounted thereon and containing a clock-train *b*, which is adapted to be actuated by a weight and cord or a spring and is provided with a suitable retarding-escapement.

The register, as herein illustrated, is constructed as to certain of its parts on the principle of the register described in Letters Patent of the United States No. 620,703, granted to me March 7, 1899, to which reference may be had for detailed exposition of the operation of said parts. The said parts, as illustrated, include devices as follows: *d d* are a series of electromagnets—four in number in the present instance—mounted beneath the base *a* and having their pole-pieces exposed above said base. The armatures of said magnets are mounted on friction-pivots and are provided with vertical arms *e' e'*, adapted to coact with a series of metal disks *c c*, mount-

ed upon a shaft *c²* in the control of a series of alarm-circuits. The shaft *c²* is rotated by the clock-train *b*, which is synchronized with the instruments at the transmitting-stations. The actuation of a transmitter starts the clock-train *b* in motion, and the disks *c* complete one revolution in the same time that the contact device in the transmitter completes a cycle. The disks *c* can be fixed at different relative rotary positions on the shaft *c²*, and the impulses from the transmitter received through its corresponding magnet of the series *d d*, will cause or not cause an audible alarm to be sounded, according to the adjustment of the corresponding disk *c*.

The several electromagnets *d d* are connected in series, respectively, with a group of four electromagnets *e e*, mounted below the base *a*, with their pole-pieces directed downwardly. The two magnets *d e* of any pair are connected directly or through a relay to the transmitting instrument, and each receives the same impulses.

e' e' represent the armatures of the magnets *e*, said armatures being pivoted by flexible springs *e²* to the magnet-frames and having their free ends normally supported by stop-screws *e³ e³*. The free ends of the several armatures converge and are alined beneath a fixed plate *f*, which has a series of slots *f'*, Fig. 6, guiding the lower ends of a series of vertical flat punch-bars *g g*. Each bar *g* has a plate *g'* riveted to its upper end, the several plates being located beneath the cross-bar *i'* of a rock-frame *i*. The side arms of said rock-frame are secured to a shaft *i²*, journaled in suitable bearings and carrying at its end an arm *i³*. A pin *i⁴* on the end of said arm is normally engaged with the end of an arm *i⁵* on an arbor of the clock-train *b*, and a second pin *i⁴* normally enters a notch *i⁷*, cut in the edge of a disk *i⁶*, mounted on another arbor of said clock-train. A spring *i⁸*, attached to the arm *i³*, normally moves it in a direction to hold its pin *i⁴* against the disk *i⁶* and to move its pin *i⁴* into the path of the arm *i³*. The first impulse through any one of the magnets *e* causes it to attract its armature and lift one of the punch-bars *g*, which in turn elevates the cross-bar *i'* to release the clock-train. The disk *i⁶* preferably

makes one revolution to one of the circuit-controller disks *c c*, and the arm *i*⁸ makes a greater number—say five. When the notch *i*⁷ again comes around, the pin *i*⁴ falls into it, and the pin *i*⁹ stops the arm *i*⁸ and arrests further movement of the clock-train. During the movement of the clock-train the message is sent in and recorded on the tape in the manner which I shall now proceed to describe.

The tape or record-strip is unwound from a suitable reel (not shown) and passes between two guide-rolls *k k*, then over the tops of the punch-bars *g g*, and between two feed-rolls *j j'*, the upper one of which is mounted on the end of an arbor of the clock-train *b* and positively rotated thereby, while the under one *j'* is a presser-roll. During the movement of the clock-train the tape, which is represented by the letter *m* in Fig. 6, is fed along through the register over the tops of the punch-bars *g*. The top ends of said bars, as shown in the drawings, are pointed to perforate the tape, and opposed to said ends, on the upper side of the tape, is an abutment-roll *o*, loosely mounted in bearings on suitable standards *o' o'*. The said roll is formed with a number of circumferential grooves *o*² *o*² above the ends of the respective punch-bars. The cylindrical periphery of the roll affords an abutment for the tape, and the grooves *o*² receive the ends of the punch-bars when the latter are elevated, whereby the ends of said bars act as punches to perforate the tape in coöperation with the abutment-roll.

The important novel feature of my invention consists in providing for a longitudinal travel of the punches with the tape or record-strip when they have been actuated to perforate said tape. In the arrangement shown in the drawings I accomplish this result by providing a fixed guide-plate *h* for the upper ends of the punch-bars *g g*, the said plate having a series of slots *h' h'*, through which the punch-bars project and which are elongated in the direction of travel of the tape. The punch-bars are normally held against the rear ends of the slots *h'* by means of light springs *g*³ *g*³, attached to the hooked ends of the plates *g'*. When one of the magnets *e* receives an impulse, its armature lifts the corresponding punch-bar *g* in a substantially-vertical path and causes it to perforate the tape, whereupon the said bar *g*, by reason of the longitudinal travel of the tape *m*, partakes of a limited oscillatory movement during the existence of the impulse. The normal retracted position of the parts is represented in Fig. 5, and the position of the punch during the existence of an impulse and at the limit of its oscillatory movement is represented in Fig. 6. During the vertical movement of the punch-bar the edges of the slots *f' h'* in the plates *f h* act as guides. During the oscillatory movement of the bar the edges of the upper slot *h'* act as a guide, while the

end of the lower slot *f'* acts as a fulcrum, the length of said slot *f'* being substantially equal to that of the width of the bar *g*, with sufficient play to allow for free vertical movement of said bar. The impulses from the transmitter will preferably be regulated as to duration so that they terminate during the period of the longitudinal travel of the punches. When the impulse in the magnet ceases, its armature and the punch-bar fall by their own weight, and the punch-bar is retracted by its spring *g*³, thereby causing it to resume its initial position. The next impulse in the magnet will then cause the punch-bar to perforate the tape in a new place. The resulting impression on the tape is a series of holes or perforations having the shape of the perforating portion of the punch. When the punch is brought substantially to a point, as described, the perforations will be a series of dots. By the described provisions for the longitudinal travel of the punch retardation of the tape is avoided and a perfect record is obtained thereon, agreeing with the message sent from the transmitter.

I do not confine myself to the exact details of construction and arrangement hereinbefore described, as the same may be variously modified without departing from the spirit of my invention, nor is the invention necessarily limited to employment in connection with registers such as the one described in my patent hereinbefore alluded to and illustrated partly in substance in the present drawings.

I claim—

1. In a register, means for horizontally guiding a record-strip, a punch-bar, guides supporting said bar in a substantially-vertical position and constructed to permit a sliding vertical punching movement thereof transversely of the strip and a horizontal movement thereof longitudinally with the strip, and an electromagnet having its armature independently guided and adapted to impart the punching movement to said bar.

2. In a register, means for guiding a record-strip, a punch-bar guided for sliding punching movement transversely of the record-strip and for movement longitudinally with the strip, an electromagnet having an armature independently guided and adapted to impart the punching movement to said bar, a support independent of said armature, and a retracting-spring connected with said support and said punch-bar.

3. In a register, means for guiding a record-strip, a punch-bar guided for punching movement transversely of the strip and for movement longitudinally with the strip, a base, an electromagnet having an armature located on one side of said base and independently guided and adapted to impart the punching movement to said bar, and a spring attached to a stationary support and to said punch-bar on the opposite side of said base from the armature and adapted to retract the bar after its said longitudinal movement.

4. In a register, means for guiding a record-strip, a bar having a punch at its end, and mounted for movement transversely of the strip to cause said punch to perforate the
5 strip, an electromagnet having its armature arranged to operate said bar, a fulcrum for said bar, having a sliding engagement therewith, and a guide for said bar elongated to permit oscillatory movement of the bar in
10 the direction of travel of the strip.

5. In a register, means for guiding a record-strip, a punch-bar, two guides having slots occupied by said bar near its two ends, the
15 slot near the punching end being longer than the width of the bar to permit a movement of

the bar longitudinally with the record-strip, the other slot having a length substantially equal to the width of the bar and its end acting as a fulcrum for the bar, said slots permitting a sliding punching movement of 20 the bar, and an electromagnet having an armature adapted to impart the punching movement to said bar.

In testimony whereof I have affixed my signature in presence of two witnesses.

EDWARD DAVIS.

Witnesses:

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C. F. BROWN.