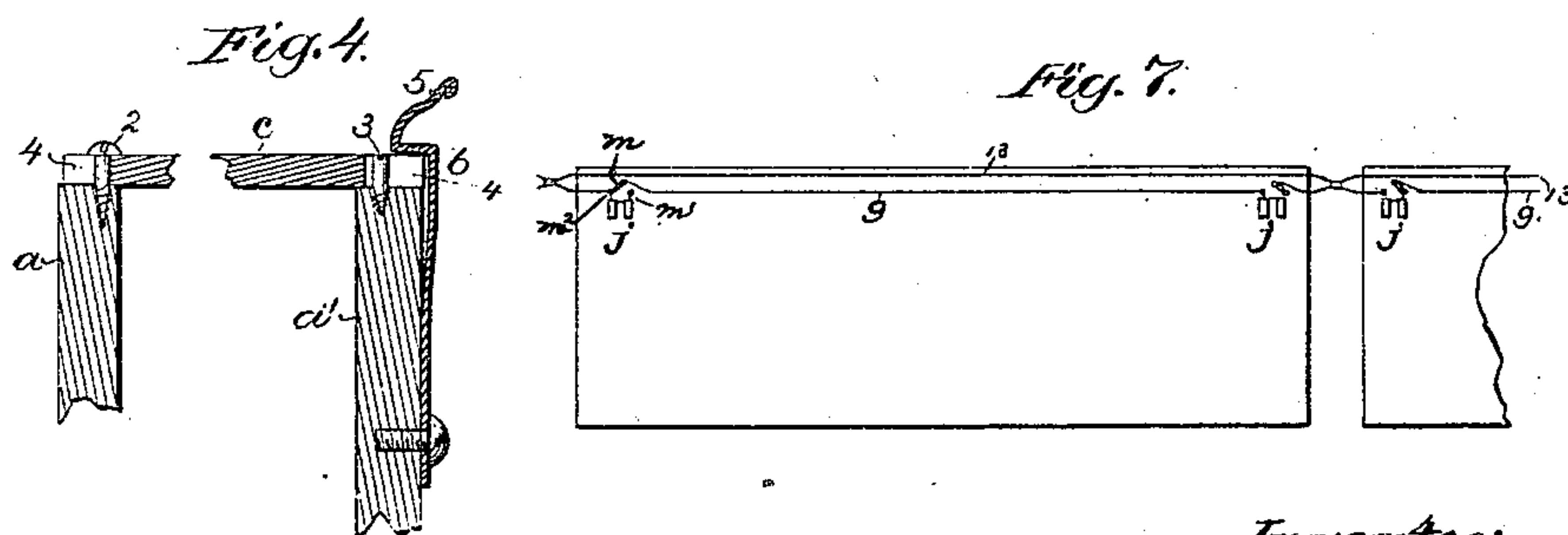
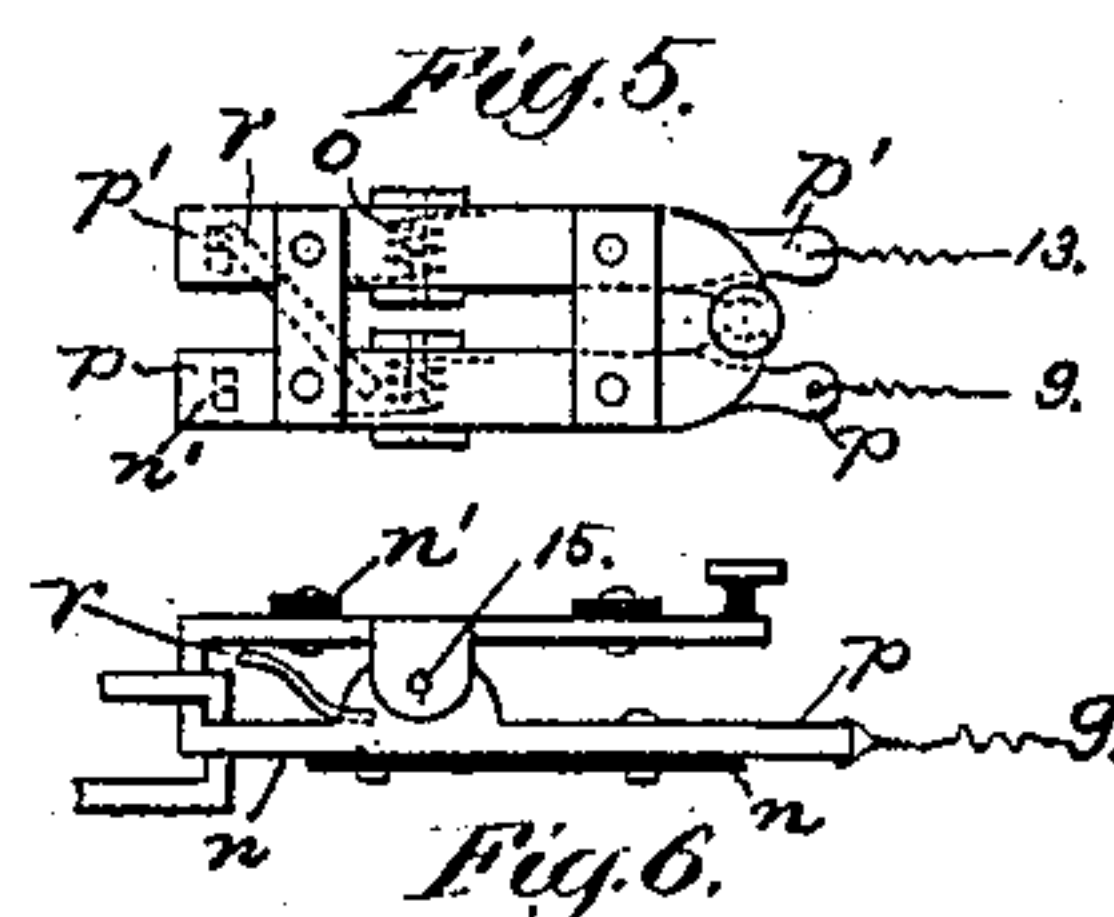
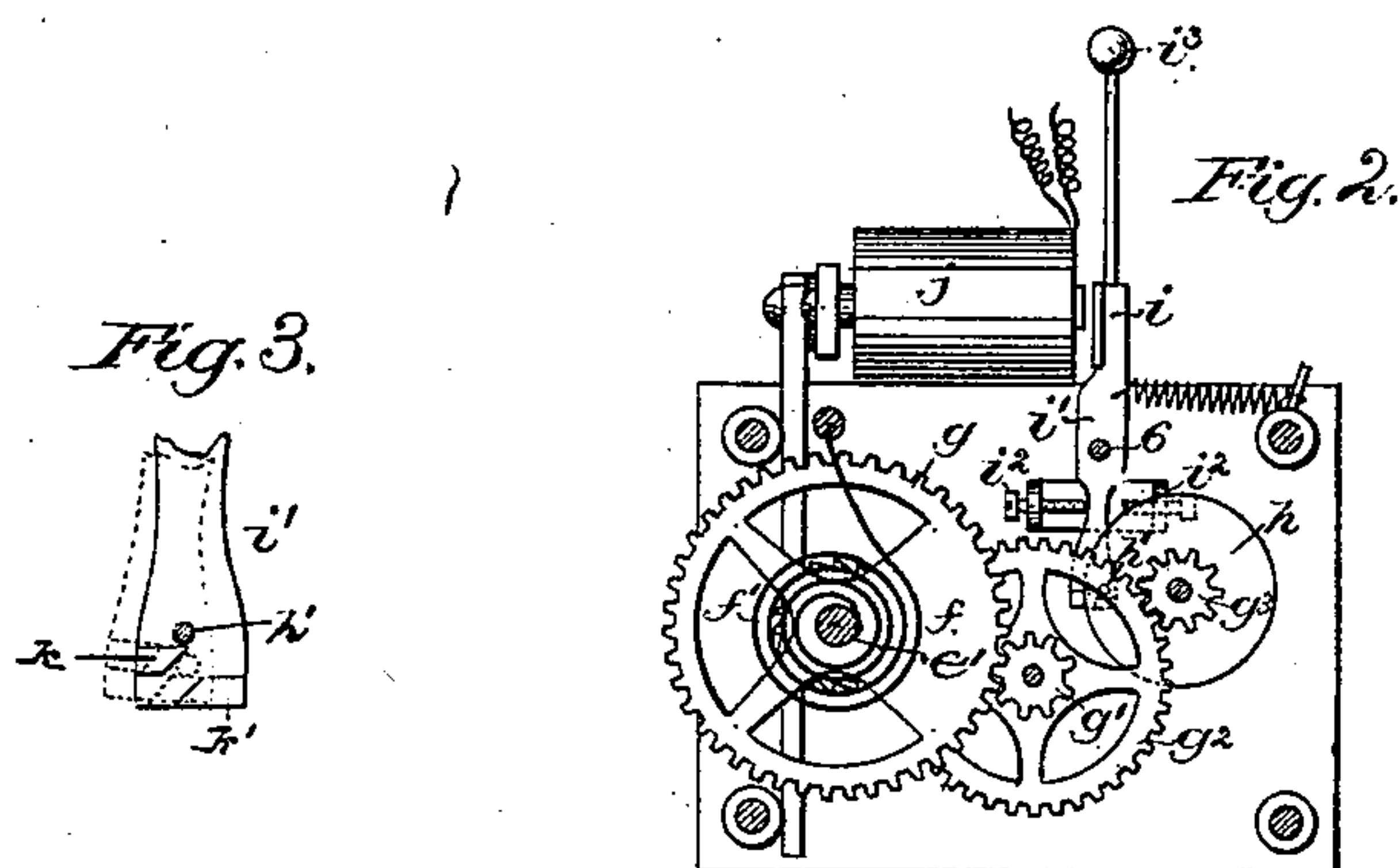
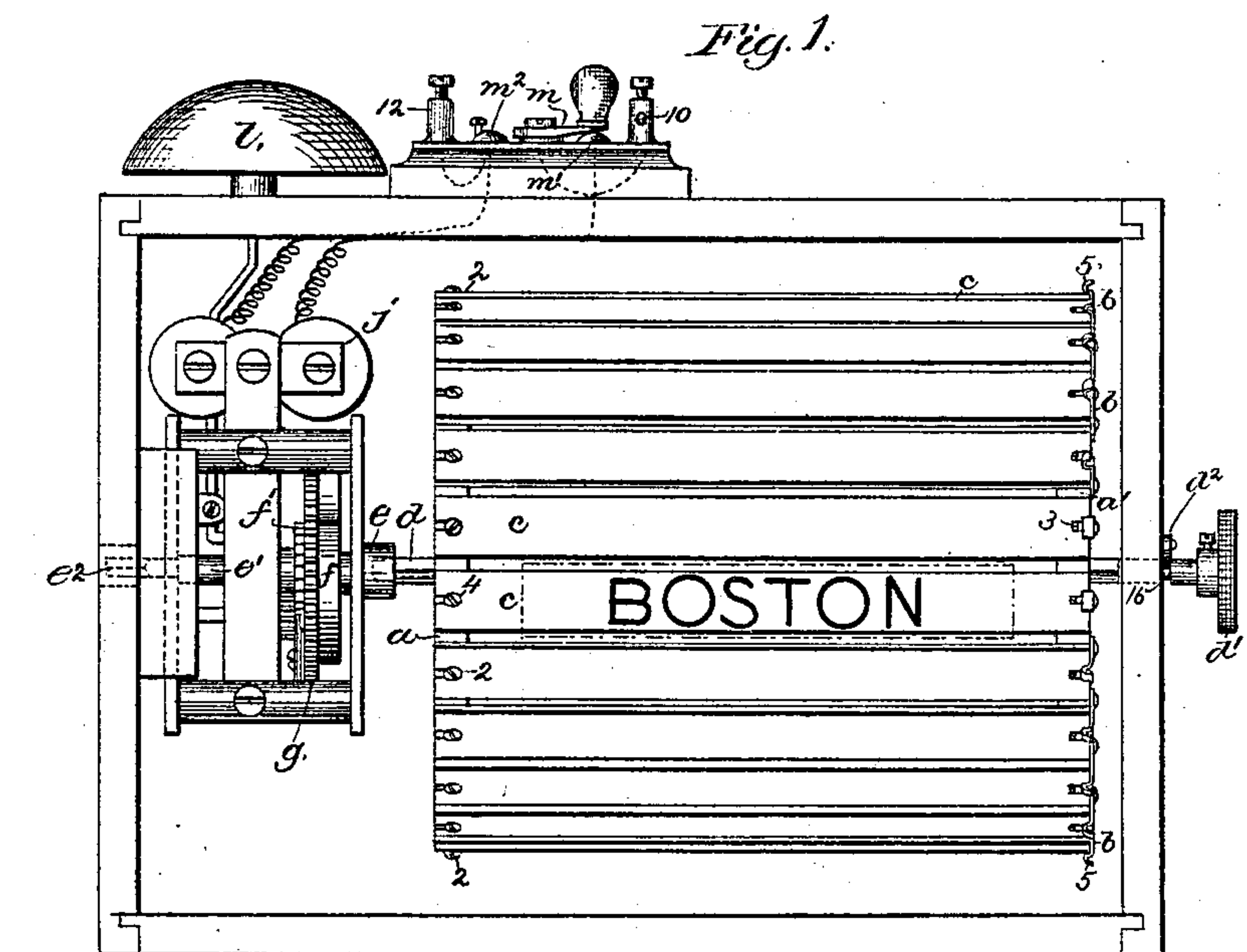


(No Model.)

J. H. BICKFORD.
STATION INDICATOR.

No. 250,490.

Patented Dec. 6, 1881.



Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN H. BICKFORD, OF SALEM, MASSACHUSETTS.

STATION-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 250,490, dated December 6, 1881.

Application filed August 29, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. BICKFORD, of Salem, Essex county, State of Massachusetts, have invented an Improvement in Station-Indicators, of which the following description, in connection with the accompanying drawings, is a specification.

My invention relates to station-indicators for railway-trains, and is shown embodied in that class of apparatus in which the indicators in the different cars are included in an electric circuit, and operated simultaneously by electric impulses.

The indicator proper, bearing the names of the stations along the route, is actuated by a mechanical motor controlled by an electro-magnet in such a manner that it moves one entire space to display a new station-sign at each complete backward and forward movement of the armature of the said magnet, it making no difference whether the circuit be normally closed and operated by breaking and again closing it to produce a movement of the armature and signal or normally opened and an electric impulse applied and then removed to produce the said movement of the indicator. The armature of the electro-magnet is provided with a bell-hammer to strike a bell, and thus call the attention of the passengers to the change of station-sign. The indicating device proper consists of two circular disks mounted upon and rotating with a shaft actuated by the said motor, and adapted to receive upon their periphery strips bearing the names of the different stations, which thus form a cylindrical drum. The said station signs or strips are made detachable, so as to be readily replaced by others, as when the route of the car is changed, and the shaft is made detachable, so that one entire drum can be easily removed and replaced by another. The motor is shown as actuated by a spring, and is wound by a backward movement of the said drum, which can readily be turned back any desired number of steps to bring it to the starting-point or to enable one drum to be put in unison with the others. I have provided a switch by which the controlling-magnet may be removed from the circuit, so that the apparatus at the rear of each car may be cut out or the resistance of its magnet

removed from the circuit. I have also provided a connecting device for continuing the circuit from one car to the other, it connecting each wire of the metallic circuit from one car to the next, and at the end of the last car connecting the terminals of the said two wires together to complete the circuit.

Figure 1 is a front view of a station-indicator apparatus constructed in accordance with my invention; Fig. 2, an end elevation of the motor and its controlling electro-magnet; Fig. 3, a detail of the escapement or stop mechanism therefor; Fig. 4, a detail of the latches by which the station signs or strips are attached to the revolving disks; Figs. 5 and 6, top and side views, respectively, of the circuit-connecting devices; and Fig. 7 a diagram illustrating the electric circuit and switches.

The indicating device proper consists of two connected disks, *a a'*, the former being provided with a series of studs, 2, and the latter with a series of pins, 3, and spring-catches *b*, (see Fig. 4,) to engage and hold in place the station-signs *c*, provided with slots 4, to engage the said studs 2 and pins 3. In attaching the said station-signs *c* to the drums *a a'*, one end is placed beneath the head of the stud 2, the slot 4 embracing the shank of the said stud, and the other end is pressed down upon the pin 3, the end 5 of the latch *b* being beveled and springing aside, and then slipping over and engaging the end of the strip *c*, as shown in Fig. 4. The said disks *a a'* are mounted on a shaft, *d*, preferably squared, and engaging a socket, *e*, upon the end of the arbor *e'*, actuated by the mainspring *f*, and provided with a ratchet, *f'*, engaging a pawl upon the gear *g*, loose upon the said shaft *e'*, and meshing with the train of wheel-work *g' g² g³*, the arbor of the last wheel of which carries the stop-wheel *h*, controlled by the armature *i* of the electro-magnet *j*. The train is so proportioned that a complete revolution of the stop-wheel *h* permits a movement of the shaft *e'* just sufficient to move the disks a space equal to the width of one of the station-strips *c*, so that a new station-strip is displayed at each rotation of the wheel *h*, the entire apparatus thus far described being inclosed in a case, as shown in Fig. 1, the front of which is therein shown as

open, and is adapted when closed to conceal the entire apparatus, except one of the station-strips, which is in place behind an opening which is therein indicated in dotted lines. The front of the said case will be hinged thereto for the purpose of obtaining ready access to the inclosed parts—as for changing the station-strips *e* when desired.

The armature *i* is mounted upon a lever, *i'*, pivoted at 6, and having its movement limited by stop-pins *i²*, the said lever being provided at its lower end with two pallets or lateral projections, *k k'*, arranged as shown in Fig. 3, the latter being slightly below the former, and having its upper face terminated nearly vertically beneath the upper face of the former.

The stop-wheel *h* is provided with an engaging projection, (shown as a pin, *h'*,) that in its rotation comes into engagement with the pallet *k* if the armature be attracted, or the pallet *k'* if it be unattracted, and is released from the pallet *k'* in its movement that takes place when the armature is attracted. By this arrangement a double movement of the armature backward and forward from either position will release the pin *h'* and permit the wheel *h* to make a revolution and the disks *a a'* to move sufficiently to bring a new station-sign, *e*, into view, and the said disks will always be stopped in proper position to display a station-sign whatever the condition of the electric circuit may be. A bell-hammer, *i³*, carried by the armature-lever *i'*, strikes a blow on the bell *l* in the movement of the armature, by which the pin *h'* is released and the station-sign permitted to change.

The spring *f* of the motor is wound by turning the shaft *d*, together with the indicator, in the backward direction, the said shaft being provided with a suitable milled head, *d'*, for that purpose, and the teeth of the ratchet *f'* correspond in position with the station-signs *e*, so that by turning the said shaft the distance of one tooth on the ratchet a new one of the said signs will be brought in position behind the opening of the case, and the different instruments may be set in unison, or so as to give the same indication throughout the train, by merely turning the said shaft *d* back until the same sign appears through the opening in each instrument, it being understood that each instrument is provided with the same number of signs bearing the same names and arranged in the same order.

The circuit-wire 9 from one pole of the battery enters the binding-screw 10, which is connected with the pivoted arm *m* of a switch, one of the buttons, *m'*, of which is connected with one electrode of the magnet *j*, and the other button, *m²*, of which is connected with the other electrode of the said magnet and with the binding-screw 12, from which the circuit is continued to the binding-screw 10 of the next apparatus. By this arrangement, when the switch *m* is on the button *m'* the magnet *j* is included in the circuit; but when on the button *m²* the

circuit passes directly by the said switch of the binding-screw 10 to the binding-screw 12, and the magnet *j* of the instrument ceases to operate. A return-wire, 13, passes throughout the train to the other pole of the battery, which may be placed in the baggage-car or in any convenient place. The wires 9 13 from the different poles of the battery are connected from car to car by a device shown in Figs. 5 and 6, it consisting of two levers or jaws, *n n'*, pivoted together at 15 and pressed toward one another by a spring, *o*. The said jaws consist of two metallic portions mounted upon insulating material, and thus mechanically connected, the connecting device being thus longitudinally divided into two independent conducting portions, *p p'*, as shown in Fig. 5, one being connected with one and the other with the other of the circuit-wires extending through the train.

Each car is provided with one of these connecting devices at each end. When desired to connect the circuit between two cars the jaws of the connecting device are separated by pressing together the other ends of the pivoted levers, and the jaws of the devices at the meeting ends of the two adjacent cars thus separated are interlocked, as shown in Fig. 6.

One portion, as *p*, of one of the jaws, as the lower one, *n*, of the connecting device, is provided with a contact-point, *r*, extending beneath the other portion, *p'*, of the opposite jaw, *n'*, in such a manner that when the said jaws are opened, embracing the corresponding devices of the next car, the said contact-point *r* is disconnected from the portion *p'* of said jaw; but when nothing is interposed between the said jaws, as at the end of the last car of the train, a contact is made between the said jaw *n'* and the point *r*, which thus connects the two portions *p p'* of the connecting device and completes the circuit from one wire to the other.

The operation is as follows: The cars throughout the train being provided with indicators having similar station-signs, *e*, similarly arranged, those at one end of the car being in one order and those at the other end in the reverse order, the switches *m* of the instruments at the forward end of the cars being on the button *m'* and those at the rear end on the button *m²*, the shafts *d* will be turned back to the starting-point of the series of station-signs *e*. If a battery be employed and the circuit is normally closed the motor will remain stopped by the engagement of the pin *h'* with the pallet *k* of the armature-lever *i'*, and when a given station is passed and it is desired to display the sign of the following station the operator breaks the circuit, permitting the pin *h'* to fall upon the pallet *k'* without, however, giving a perceptible movement of the shaft *d* and indicating-cylinder, after which he again closes the circuit, causing the armature *i* to be attracted and the pallet *k'* to be withdrawn from beneath the pin *h'*, thus releasing the wheel *h*, which is again stopped by the engagement of the pin *h'*

with the pallet *k* after substantially an entire revolution of the said wheel and a sufficient movement of the shaft *d* to bring a new station-sign in view through the opening in the inclosing-case. This operation may be produced by a circuit-breaker at any point in the train—as for, instance, by moving one of the switches *m* off from its button and then returning it. If the circuit were normally opened or closed, but without a constant current, as when a magneto-generator is employed, the operation would be similar, except that the pin *h'* would be released by the first movement of the armature and would be first stopped, either by the pallet *k* or pallet *k'*, according as the impulse was of greater or less duration than the time occupied by the rotation of the wheel *h*.

The shaft *d* is made to be withdrawn longitudinally from the disks *a a'*, and the entire drum, consisting of the said disks and station-signs thereon, can be removed bodily from the inclosing-case, the said shaft being normally held in place by a catch, *d*², engaging an annular groove, 16, in the said shaft.

If desired, the handle *d'* may be removed and the motor wound and indicating-drum set by a suitable key inserted through the inclosing-case, the shaft *e* being shown in dotted lines at *e*² as squared for this purpose.

By making the station-signs detachable and the entire indicating-drums removable the apparatus can be conveniently employed with cars which are used at different times upon different routes.

I claim—

1. The combination, with the series of station-signs and motor to move them in one direction, provided with a stop-wheel having an engaging projection, of the electro-magnet and its armature-lever provided with two pallets properly arranged for one to engage the said projection when the armature is attracted, and

the other to engage the said projection with the said stop-wheel at substantially the same point when it is unattracted, whereby the same station-sign will be displayed whether the circuit be left open or closed, substantially as described.

2. In a station-indicator, the indicator-shaft and means to control its movements, combined with the disks mounted upon the said shaft, one provided with studs and the other with spring-catches, and the detachable station-signs adapted to be held in place upon the said disks by the said studs and catches, substantially as described.

3. In a station-indicating apparatus, the following elements in combination: the indicator proper, provided with station-signs and the motor to actuate it and electro-magnet to control the said motor, and the signal bell operated by the armature of the said controlling-magnet, all arranged and to operate substantially as and for the purpose set forth.

4. The herein-described circuit-connecting device, consisting of two jaws pivoted and pressed together by springs, each jaw being divided electrically into two portions, to be connected with the two wires of the circuit, and a contact-piece connected with one portion of one of the said jaws and arranged to make a contact with the other portion of the other jaw when the jaws are closed together, but to be disconnected therefrom when the said jaws are separated, as when embracing, the terminals of the other wires to be connected by the said device, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN H. BICKFORD.

Witnesses:

JOS. P. LIVERMORE,
W. H. SIGSTON.