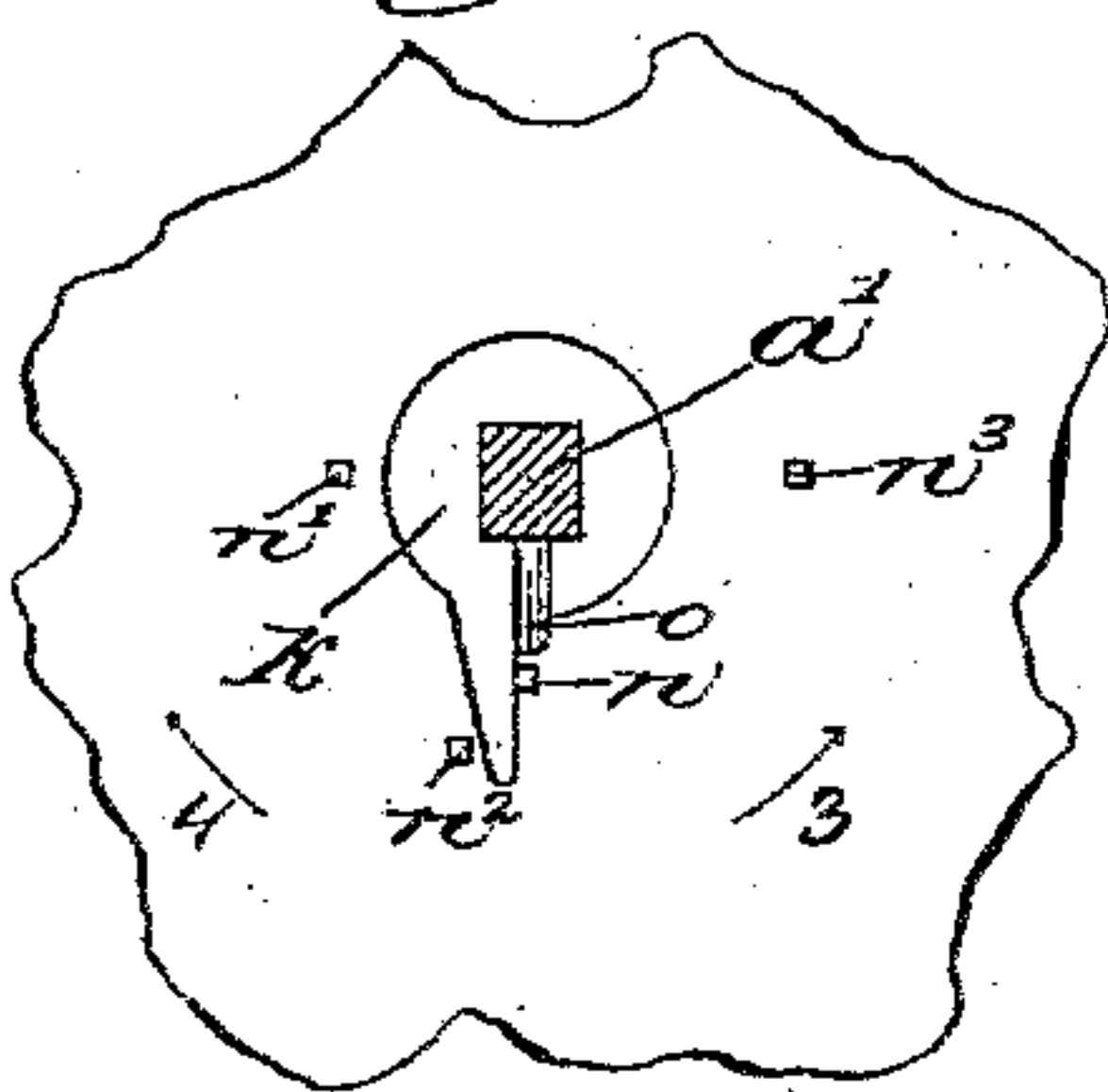
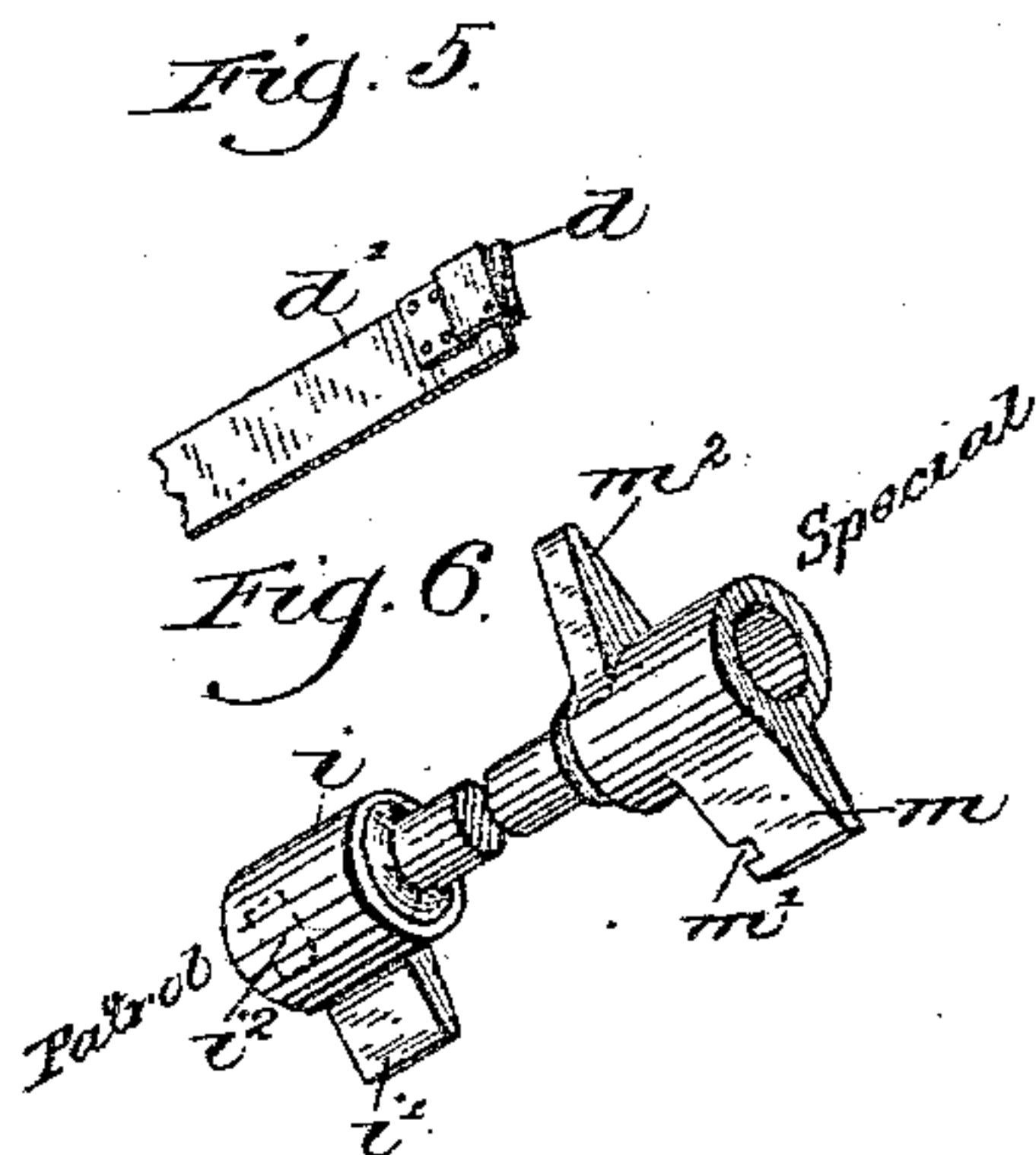
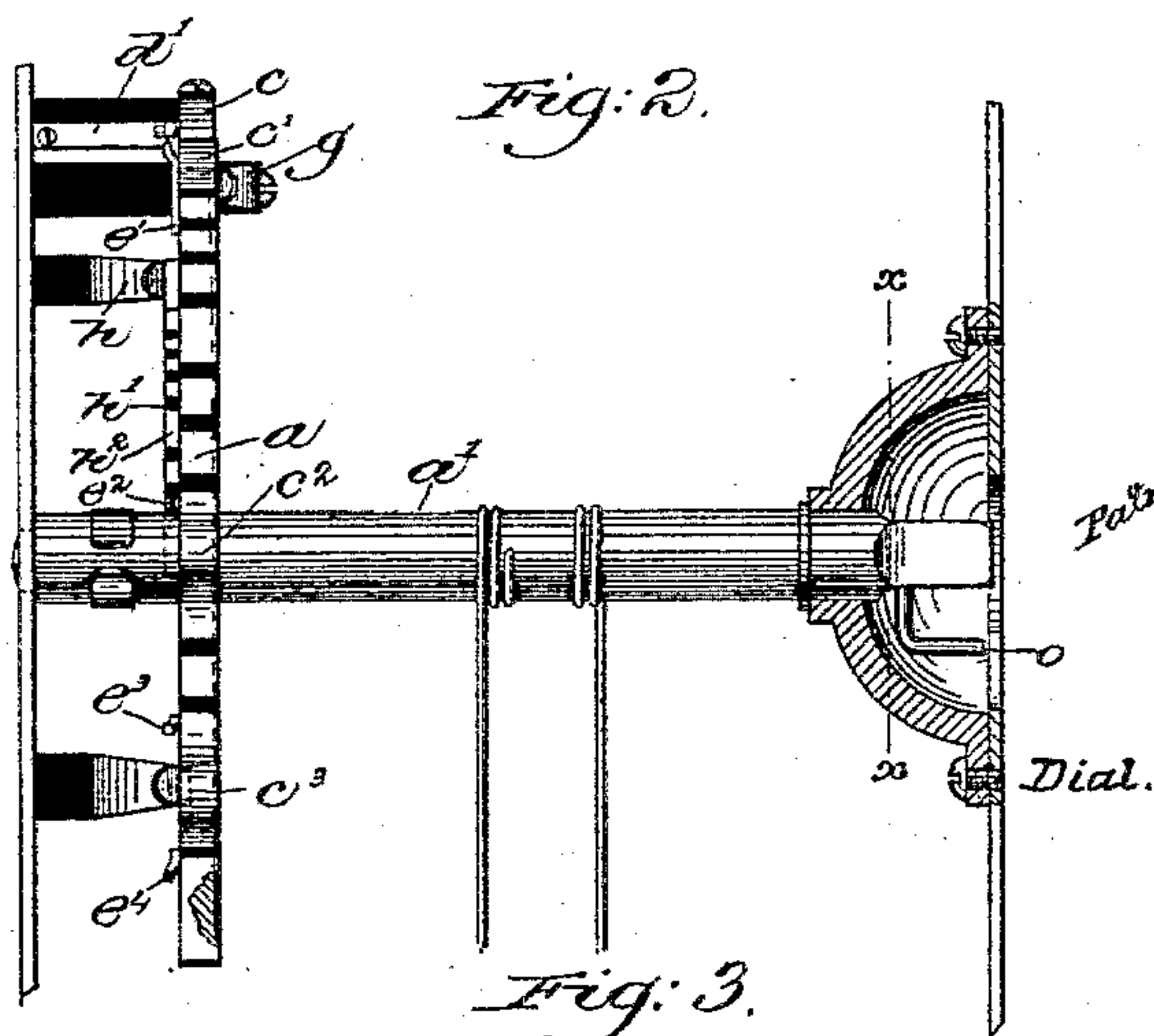
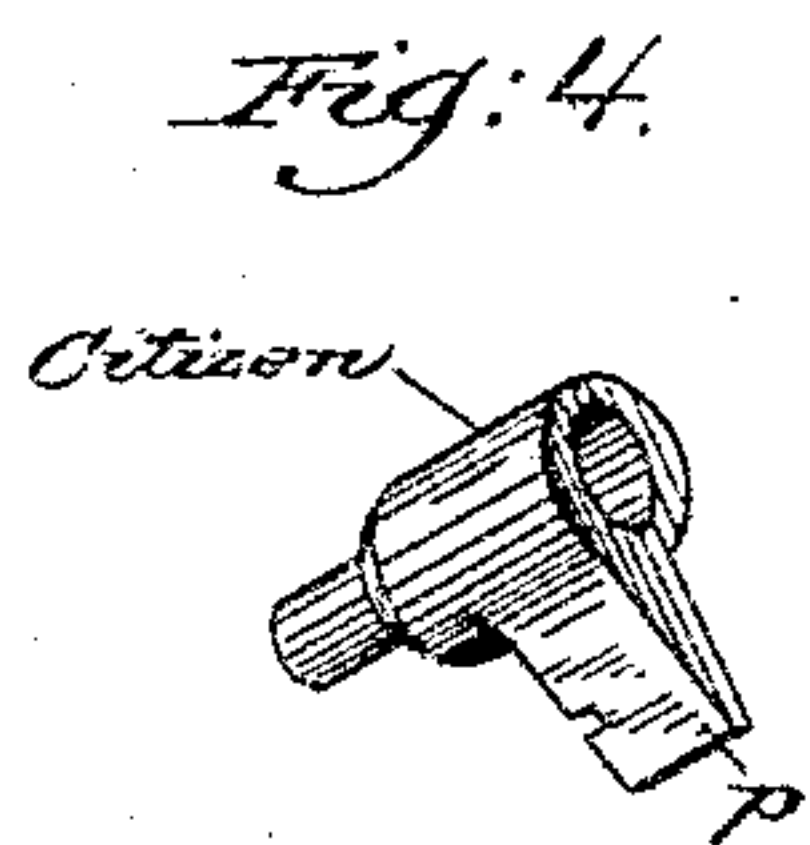
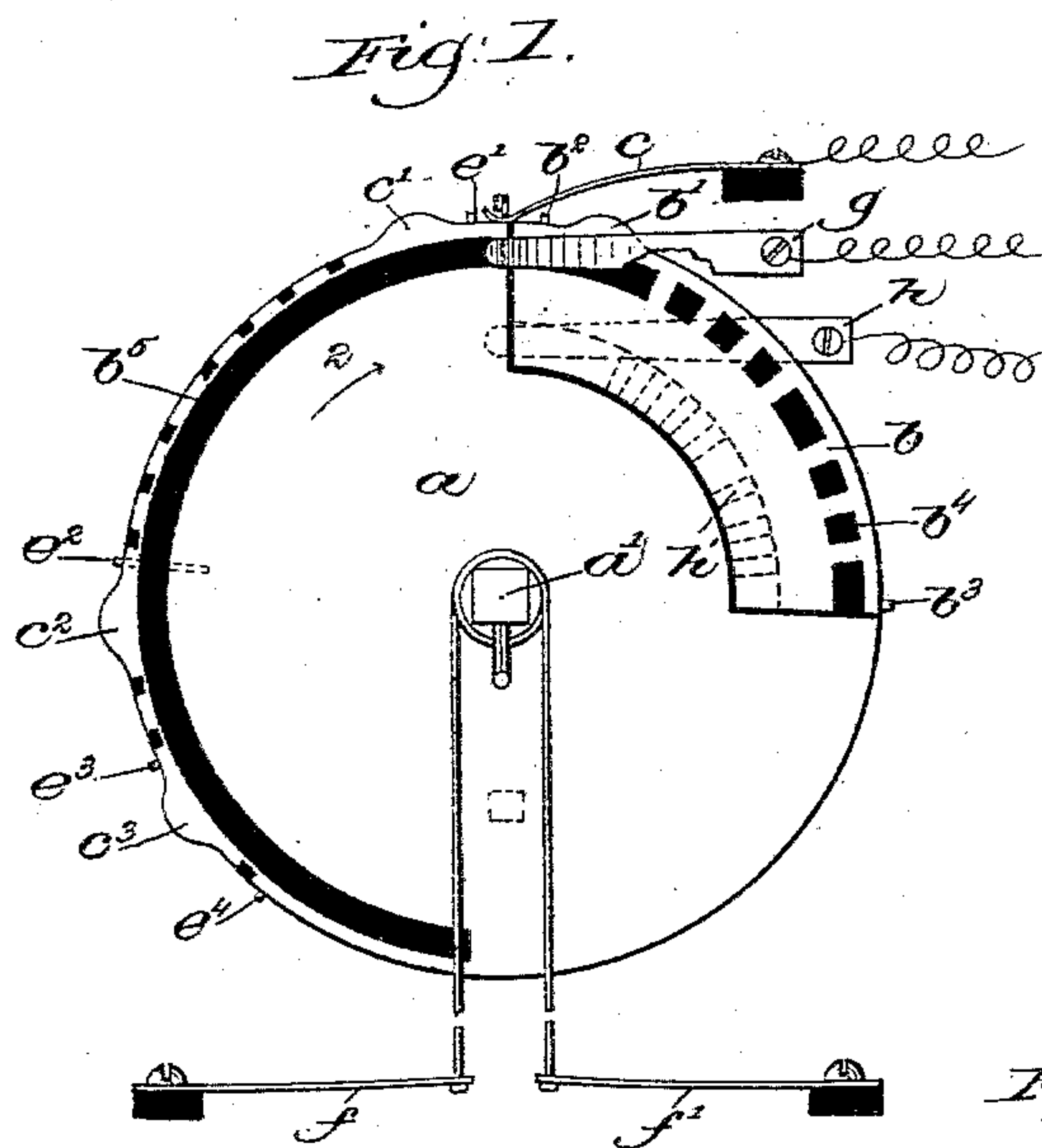


2 Sheets—Sheet 1.

MUNICIPAL SIGNAL APPARATUS.

Patented Mar. 22. 1887.



Witnesses:  
 Fred L. Emery,  
 Thomas Hobday

Inventor,  
Bernice J. Noyes  
by Leroy Gregory atty's.

(No Model.)

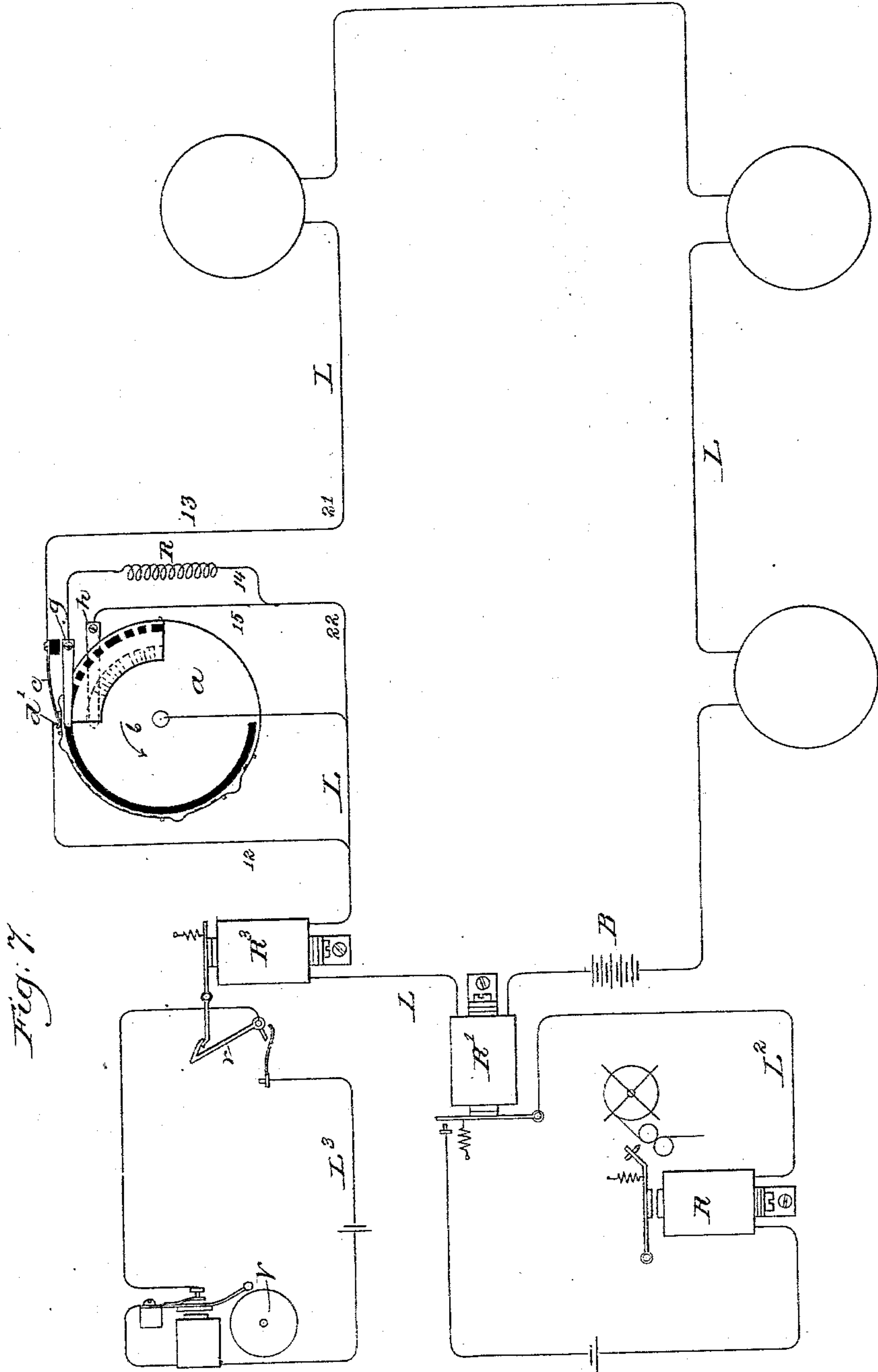
2 Sheets—Sheet 2.

B. J. NOYES.

MUNICIPAL SIGNAL APPARATUS.

No. 359,687.

Patented Mar. 22, 1887.



Witnesses  
Fred L. Emery.  
Thomas Hobday

Inventor  
Bernice J. Noyes  
by Leroy & Gregory  
attys.



# UNITED STATES PATENT OFFICE.

BERNICE J. NOYES, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE  
MUNICIPAL SIGNAL COMPANY, OF PORTSMOUTH, N. H.

## MUNICIPAL SIGNAL APPARATUS.

SPECIFICATION forming part of Letters Patent No. 359,687, dated March 22, 1887.

Application filed May 5, 1886. Serial No. 201,134. (No model.)

*To all whom it may concern:*

Be it known that I, BERNICE J. NOYES, of Boston, county of Suffolk, and State of Massachusetts, have invented an Improvement in  
5 Municipal Signal Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to construct  
10 a municipal or police signal system which may be cheaply made, yet capable of efficiently accomplishing the results considered necessary.

In accordance with this invention a series of signal-boxes or sub-stations are connected  
15 by an electric circuit with a main station. Each signal-box or sub-station contains a multiple signaling device for sending signals of different character or significance, and the main station is provided with suitable means  
20 for receiving the said signals, and also with suitable means for audibly warning the attendant when signals of one or another character or class are being received.

The multiple signaling device located at the  
25 sub-stations consists of a break-wheel comprising a disk, a segment or portion of which is insulated from the remaining portion. The periphery of the disk is provided with several groups of signals, so that when brought into  
30 co-operation with a contact-pen one or another signal is transmitted. The main portion of the disk, or "break-wheel," as it may be termed, is connected with the main circuit, and the contact-pen normally bears upon the periphery  
35 of this portion of the disk, said contact-pen being also connected with the main circuit. The disk is mounted upon a shaft under the control of the operator. Suitable means are provided for locking the contact-pen out of  
40 contact as the disk is revolved in one direction and for releasing said pen to make contact as the disk assumes its normal position, said means being such as shown and described in another application filed by me concurrently with this. It is herein designed that  
45 the main portion of the disk shall transmit the special or want signals by total interruptions of the current. The disk is also so constructed and arranged to be revolved in an opposite

direction that the contact-pen may make con- 50  
tact with the insulated segment, which is provided with a signaling-surface corresponding with the number of the box indicative of its locality, and similar means are employed for  
55 disengaging and restoring the contact-pen, as previously described. Suitable auxiliary pens are employed, normally in contact with the said segmental portion, which, when brought into  
60 co-operation with the revolving disk, interposes a suitable resistance into the line, that the current may be reduced in strength at intervals. Suitable keys are employed for revolving the disk in opposite directions, said  
65 keys being so shaped that they can only be employed for the purposes intended.

It is herein designed that a policeman shall send in his "on duty" signal by reduction in the current strength, and in this instance, the segmental portion of the disk being employed,  
70 only the box-number is transmitted.

It is also designed that certain authorized citizens shall have access to the boxes when in need of assistance to transmit a signal, such  
75 signal in this instance being transmitted upon the main portion of the disk, the keys carried by the citizens being suitably shaped to transmit only the box-number, while the key carried by the policeman is so shaped that he can  
80 transmit upon the main portion of the disk or multiple signaling device any desired signal.

At the main station a relay is interposed in the main line, which responds to both reductions in the current strength and also to total interruptions thereof, said relay controlling a  
85 local circuit, in which any suitable recorder or register is connected, to thus record all signals transmitted by the multiple signaling device, whether patrol or special signals. Another relay is also connected with the main line,  
90 which is adjusted to respond to only total interruptions in the current, said relay, by means of an annunciator-drop, controlling a local circuit in which a vibrating or other suitable bell  
95 or gong is located, so that when any special signal or one demanding immediate attention is received, which in this instance is transmitted by total interruptions in the current, an audible warning is given to the attendant of



such fact, calling his attention to the recorder or register, which otherwise he might not do, as the patrol-signals are received.

Figure 1 shows in front elevation the multiple signaling device contained within the box or sub-station; Fig. 2, a side view of Fig. 1, the case containing the apparatus being broken away; Fig. 3, a rear side view of Fig. 2, taken on the dotted line  $x x$ , Fig. 2, and looking toward the right; Figs. 4, 5, and 6, details to be referred to; Fig. 7, a diagram showing a circuit in which four boxes are placed, and also the central station, to more clearly illustrate the electrical connections.

The multiple signaling device consists of a single break-wheel divided to comprise a main portion,  $a$ , and a segmental portion,  $b$ , insulated from each other, said break-wheel or disk being mounted upon a shaft,  $a'$ , having its bearings in the opposite sides of the box or case A, only a portion of which is shown in Fig. 2. A yielding or movable contact-pen,  $c$ , is provided, which normally bears upon the periphery of the main portion of the disk  $a$ . Several cams or projections,  $c'$   $c^2$   $c^3$ , rising from the surface of the disk  $a$ , cause the contact-pen  $c$  to rise as the disk is revolved in the direction of the arrow 2, and when said pen  $c$  arrives in its most elevated position it is passed over upon a latch,  $d$ , (see Fig. 5,) pivoted to a spring or yielding arm,  $d'$ , attached to the box or case A. The contact-pen  $c$  is thus locked out of engagement with the break-wheel.

The surface of the main portion  $a$  of the disk between the several cams or projections  $c'$   $c^2$   $c^3$  is notched or provided with insulating portions, which may be termed "signaling-surfaces," the first one of the said series of notches being such as to indicate the number of the box, while any arbitrary number may be employed for the others.

Several pins,  $e'$   $e^2$   $e^3$ , are attached to the disk  $a$ , projecting above the periphery thereof, so that as the break-wheel is revolved in the direction of the arrow 2 thereon one of the said pins, as  $e^2$ , will strike the yielding arm  $d'$ , and thereby release the contact-pen  $c$ . The contact-pen  $c$ , as the break-wheel thus returns to its normal position, will cause a signal—in this instance the box-number—to be transmitted. If any other number is to be transmitted besides the box-number, the break-wheel is revolved in the direction of the arrow 2 farther than that just described, the movement of the contact-pen being first thrown out of engagement by a cam,  $c'$ , released by the pin  $e^2$ , again thrown out of engagement by the cam  $c^2$  and released by the pin  $e^3$ , and an arbitrary signal—in this instance two dots or dashes—will first be transmitted as the break-wheel returns, followed by the box-number.

If a second signal besides the box-number is to be transmitted, the break-wheel is revolved in the direction of the arrow 2 sufficiently to cause the pin  $e^4$  to release the contact-pen, when a different signal will be transmitted upon the return of the break-wheel, followed

by the box-number, it being in this instance one dot followed by two dashes, followed by the box-number.

Instead of employing the box-number, any other arbitrary signal may be employed, and as many other signaling-surfaces in addition thereto as may be desired.

The construction and operation of the main portion  $a$  of the break-wheel and its contact-pen thus far described are similar to that shown and described in another application filed by me concurrently with this. The segmental portion  $b$ , insulated from the main portion of the break-wheel, has upon its periphery a cam or projection,  $b'$ , and two pins,  $b^2$   $b^3$ , which act upon the contact-pen  $c$ , as before described; but in this instance the surface of the segment is not provided with notches. To the under side of the segmental portion  $b$  a series of insulated portions,  $b^4$ , are inlaid or attached, the number corresponding with the number of the box, while a continuous strip of insulating material,  $b^5$ , is attached to one side of the main portion  $a$  of the break-wheel, near the periphery thereof and in the path of the contact-pen  $c$ , so attached as to co-operate with the said strip  $b^5$  and the portion  $b^4$ . Another contact-pen,  $h$ , is provided to co-operate with a second series of insulated portions or breaks,  $h'$ , cut or mounted in a raised segmental strip,  $h^2$ , secured to the segment  $b$ , the said pen  $h$  normally lying beyond the end of the said segmental portion  $h^2$ , or out of contact.

It is preferable that the contact-pens  $g$  and  $h$  be located upon opposite sides of the break-wheel; but it is obvious that they may be located upon the same side. If desired, the insulating-strip  $b^5$  may be omitted, and the series of breaks  $b^4$  act on a segmental strip, as the segmental strip  $h^2$ , the contact-pen in such instance lying out, as does the pen  $h$ . The series of breaks  $h'$  in the segmental strip  $h^2$  of the segment  $b$  are arranged alternately with the series of breaks  $b^4$ , for the purpose to be hereinafter described. It is designed in this instance that a patrolman shall transmit to a central station his patrol or "on duty" signal, and also, when necessary, any special signal required. It is also designed that certain authorized persons shall have access to the box to transmit a signal, which will preferably be the box-number, when in need of assistance. To this end certain keys are constructed which can only operate the box to accomplish the desired result.

The key carried by the patrolman, as shown in Fig. 6, consists of a two-ended key, one end, as  $i$ , and marked "Patrol," having a projection,  $i'$ , and a squared socket,  $i^2$ , (see dotted lines,) that it may fit upon the square-ended shaft  $a'$  when inserted through a key-hole,  $k$ , the projection  $i'$  bearing at such time against a stop,  $n$ , (see Fig. 3,) to prevent rotation in the direction of the arrow 3, but to permit rotation in the opposite direction until it strikes a projection,  $n'$ . At this time, with the key



described, the furthestmost portion of the segmental portion *b* is brought beneath the contact-pen *c*, and, the key being released by the patrolman, the segmental portion of the break-wheel will immediately return to its normal position by the spring *f'*, the free end of which is connected with a cord passing around the shaft *a'*, this segmental portion being designed to transmit the patrol-signal.

If any want or special signal is to be transmitted, the main portion of the break-wheel is utilized and the opposite end of the patrolman's key, which latter is provided with a projection, *m*, somewhat longer than the projection *i'*, and having a recess, *m'*, that when inserted in the key-hole *k* it may pass over the stop *n*. The shank of this end of the key is cylindrically socketed, to thus turn freely upon the square end of the shaft *a'*. When this end of the key is employed, which may be termed the "special key," the projection *m* will bear against the stop *n*, to prevent movement of the break-wheel in the direction of the arrow 4; but by the recess *m'* it may be turned in the opposite direction, and, striking against the bent pin or arm *o*, thus rotate the break-wheel in the direction of the arrow 2, Fig. 1, as far as desired, to thus set up any signal desired to be transmitted.

The special end of the key is provided with a projection, *m*, which may co-operate with a suitable dial arranged about the key-hole *k*, to determine how far the key shall be turned in order to turn the break-wheel sufficiently far to cause one or another pin, as *a*<sup>2</sup> *a*<sup>3</sup> *a*<sup>4</sup>, to release the contact-pen that it may wipe over the surface of the break-wheel as the latter returns to its normal position by the aid of the spring *f*, the free end of which is connected with a cord wound about the shaft *a'*.

It is desired to have a citizen transmit the box-signal only, and not to tamper with the patrol-signal, and a key such as shown in Fig. 4 is employed, it having a projection, *p*, somewhat longer than either of the projections *i'* or *m*, so that when inserted in the key-hole *k* it will bear against the stop *n* and prevent rotation of the break-wheel in the direction of the arrow 4, but permit it to rotate the shaft in the opposite direction until it strikes the stop *n*, when the break-wheel will have been revolved sufficiently far in the direction of the arrow 2, Fig. 1, to transmit the box-number. It is designed in this instance that all signals shall be recorded upon a single instrument, but that when any signal other than a patrol-signal is transmitted a suitable audible warning will be given to notify the attendant of such fact.

Referring to Fig. 7, a circuit is shown wherein several signal-boxes and the main or central station are shown in diagram. The main portion of the break-wheel *a* is connected with a main circuit, *L*, it including the battery *B*. The contact-pen *c* is also connected with the main circuit *L* and normally bearing upon the portion *a* of the break-wheel, thus forming a

closed circuit. The yielding arm or locking device *d'* is connected with the main circuit by a branch wire, 12, so that when the contact-pen is thrown out of contact with the surface of the break-wheel and locked a short circuit is formed round the break-wheel, which is broken when the pen is released by one of the pins projecting from the surface of the break-wheel. The contact-pens *g* *h* are normally out of contact, and are each connected by a branch wire with the main line *L*, a branch wire connecting the pen *g*, including a suitable resistance, *R*, and as the pens *g* *h* are arranged to alternately co-operate with the pen *c*, the resistance is alternately interposed into the line, which reduces and restores to its normal condition the strength of the current.

A relay, *R'*, is included in the main-line circuit *L*, which will respond to either a total break or to a reduction in the current, it having a stronger retractor. The armature of the relay *R'* controls a local circuit, *L*<sup>2</sup>, in which is placed a receiving-instrument—such, for instance, as an ordinary recorder or registering apparatus, *R*<sup>2</sup>. A relay, *R*<sup>3</sup>, is also included in the main-line circuit *L*, which is adjusted to only respond to total breaks in the line, and not to a reduction in the current strength, the armature-lever of the said relay *R*<sup>3</sup> when released in turn releasing an annunciator, which closes the local circuit *L*<sup>3</sup>, thereby causing a vibrating bell, *V*, located therein to continuously vibrate until the drop *r* is positively returned to its normal position.

It will be seen that as any special or want signal is transmitted over the main portion *a* of the break-wheel the current is rapidly broken, releasing the annunciator-drop *r*, and also causing the relay *R'* to respond, the operation of the co-operating contact-pen *c* having been previously described.

When the patrolman desires to transmit his patrol-signal, the break-wheel is revolved in the direction of the arrow 6 thereon until the contact-pen *c* is out of contact, but not breaking the circuit, and when he releases his hold upon the key the break-wheel will return to its normal position, and during such movement there will be two circuits from the point 21 to the point 22, over which the current alternately travels, one over the branch wire 13, contact-pen *c*, contact-pen *g*, and wire 14, including a resistance, and the other over wire 13, contact-pen *c*, contact-pen *h*, and branch wire 15, so that the current is alternately reduced in strength and restored to its normal condition, the relay *R'* only responding as previously described.

It is obvious that the multiple signaling device herein described may be employed for transmitting any other class of signals besides that such as herein referred to, and, also, if desired, the same may be employed to operate two independent receiving-instruments at a central station.

I do not desire to limit myself to the means herein shown for interposing the resistance



into the main line, as it is obvious that other means may be devised to co-operate with the signal-transmitting apparatus to vary the strength of the current.

5 I claim—

1. A system for transmitting signals from a sub-station to a central station over a main circuit, wherein are combined a multiple signal-transmitter, which is located at the sub-  
10 station and constructed and arranged to transmit several different signals by current changes of one or another character, a message receiving instrument at the central station, which receives the signal transmitted, and an audible  
15 alarm, also located at the said central station, which responds to the current change of one character only, whereby an audible warning may be sounded for some and not for other signals, substantially as described.

2. A system for transmitting signals from a sub-station to a central station, wherein are combined a signal-transmitting apparatus, which is located at the sub-station and is constructed and arranged to change the condition  
25 of the circuit to transmit different signals, a message-receiving instrument located at the central station, which receives the different signals transmitted, and an audible alarm or indicating signal, also located at the central  
30 station, adapted to respond and thus notify the attendant when some of the messages await reply, but not others, substantially as described.

3. A system for transmitting signals from a sub-station to a central station, wherein are  
35 combined a signal-transmitting apparatus, which is located at the sub-station and is constructed and arranged to totally break or vary the strength of the current, a message-receiving instrument located at the central station,  
40 responsive to all changes in the condition of the current caused by the signal-transmitting apparatus, and an audible alarm or indicating signal which responds only to total interruptions of the current, substantially as described.

4. In an electric circuit, a break-wheel comprising a main portion and an insulated segment, and a co-operating pen for said break-wheel, combined with two relays, one of which is  
45 adjusted to changes in the condition of the current caused by either the main portion or segmental portion of the break-wheel, and the other of which is adjusted to respond to changes in the condition of the current caused by one  
50 portion only of the break-wheel, substantially as described.

5. In an electric circuit, a break-wheel comprising a main and an insulated segment, a pen co-operating therewith, and a shaft upon which the said break-wheel is mounted, combined  
55 with means, substantially as described, for revolving the shaft in one or the opposite direction, and with means, substantially as described, for returning the break-wheel to its normal position when turned in either direc-  
60 tion, as set forth.

6. In an electric circuit, a signal-transmitting apparatus consisting of a disk comprising a main and segmental portion, each of which has signaling-surfaces thereon, combined with a movable or yielding pen adapted to co-op-  
70 erate with either part, and with means, substantially as described, for throwing the said pen out of contact while the signal is being set up, as set forth.

7. In an electric circuit, a signal-transmitting apparatus consisting of a two-part disk having signaling-surfaces thereon and a pen adapted to co-operate with either part, combined with a locking device attached to the yielding or movable arm to hold the said pen  
80 out of engagement while the signal is being set up, with a releasing device, substantially as described, for releasing the pen to transmit the signal, as set forth.

8. In an electric circuit, the combination, 85 substantially as described, of a signal-transmitting apparatus consisting of a two-part disk having signaling-surfaces on each part, a co-operating pen for either part, and means, substantially as described, co-operating with  
90 one part for interposing a resistance into the line, two relays connected in the circuit, one of which is adjusted to respond to a signal transmitted by one portion of the disk, and the other of which is adjusted to respond to both  
95 portions of the disk.

9. In an electric circuit, a signal-transmitting apparatus consisting of a two-part disk having signaling-surfaces thereon, each part of which is insulated from the other, and a  
100 pen co-operating with either part, combined with two pens, *g h*, connected by branch wires with the main circuit, and one of which branch wires contains a resistance, and alternately-  
105 arranged breaks located upon one portion of the said break-wheel, and with which the pens *g h* co-operate for alternately interposing a resistance into the main line as the disk revolves, substantially as described.

10. In a system for transmitting signals from  
110 a sub-station to a central station, a signal-transmitting apparatus consisting of a break-wheel and shaft upon which it is mounted, combined with a two-ended or compound key, by which the shaft may be revolved in one or the other  
115 direction, all substantially as described.

11. In an electric circuit, a multiple signaling device and a shaft for operating it, combined with a key having a projection upon one side to co-operate with a dial to determine  
120 the distance the said shaft shall be revolved to transmit a determinate signal, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two sub-  
125 scribing witnesses.

BERNICE J. NOYES.

Witnesses:

F. CUTTER,

C. M. CONE.