

C. S. EATON.  
Electric Call for Telephones.  
No. 228,047. Patented May 25, 1880.

Fig. 1

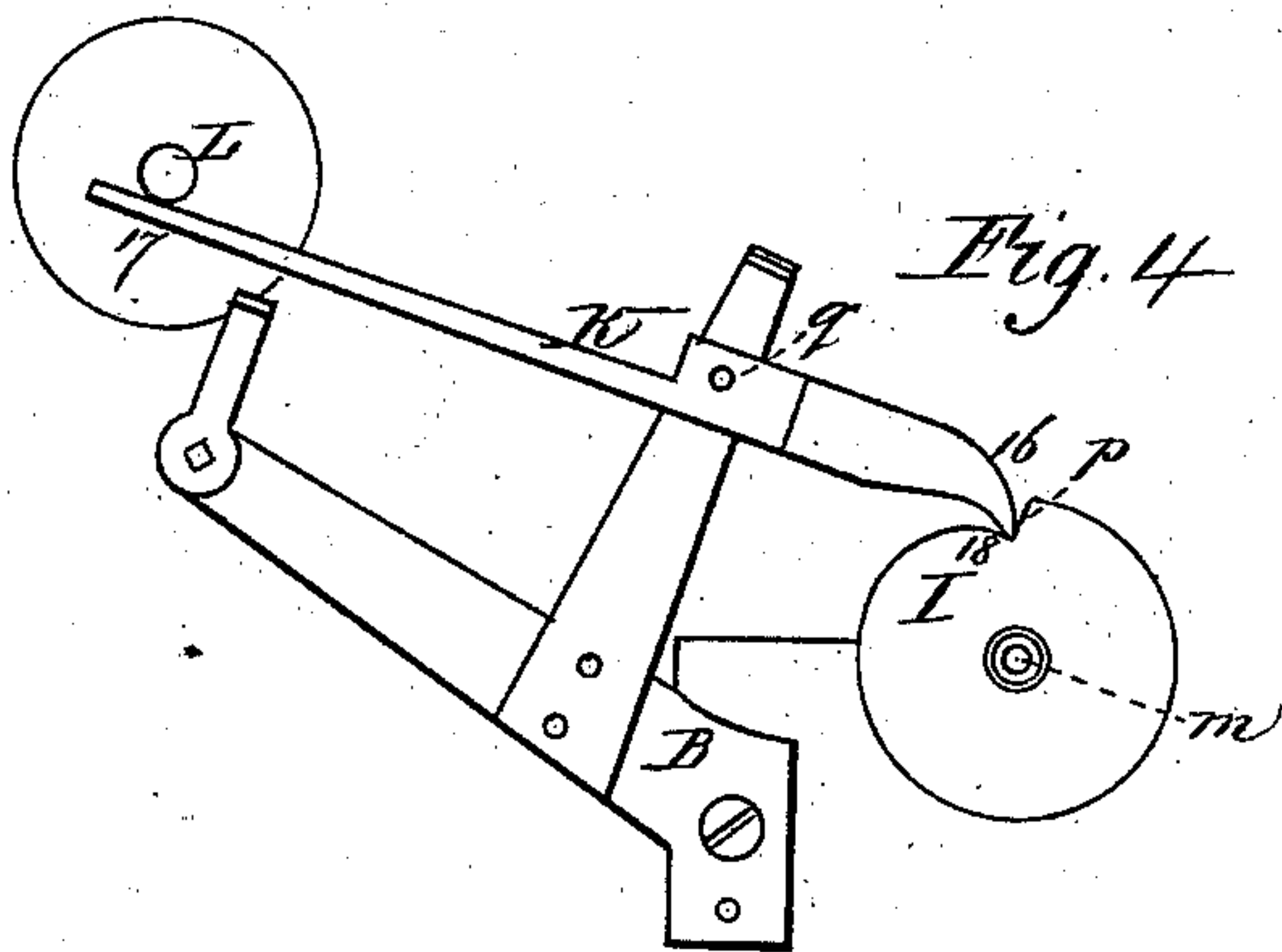
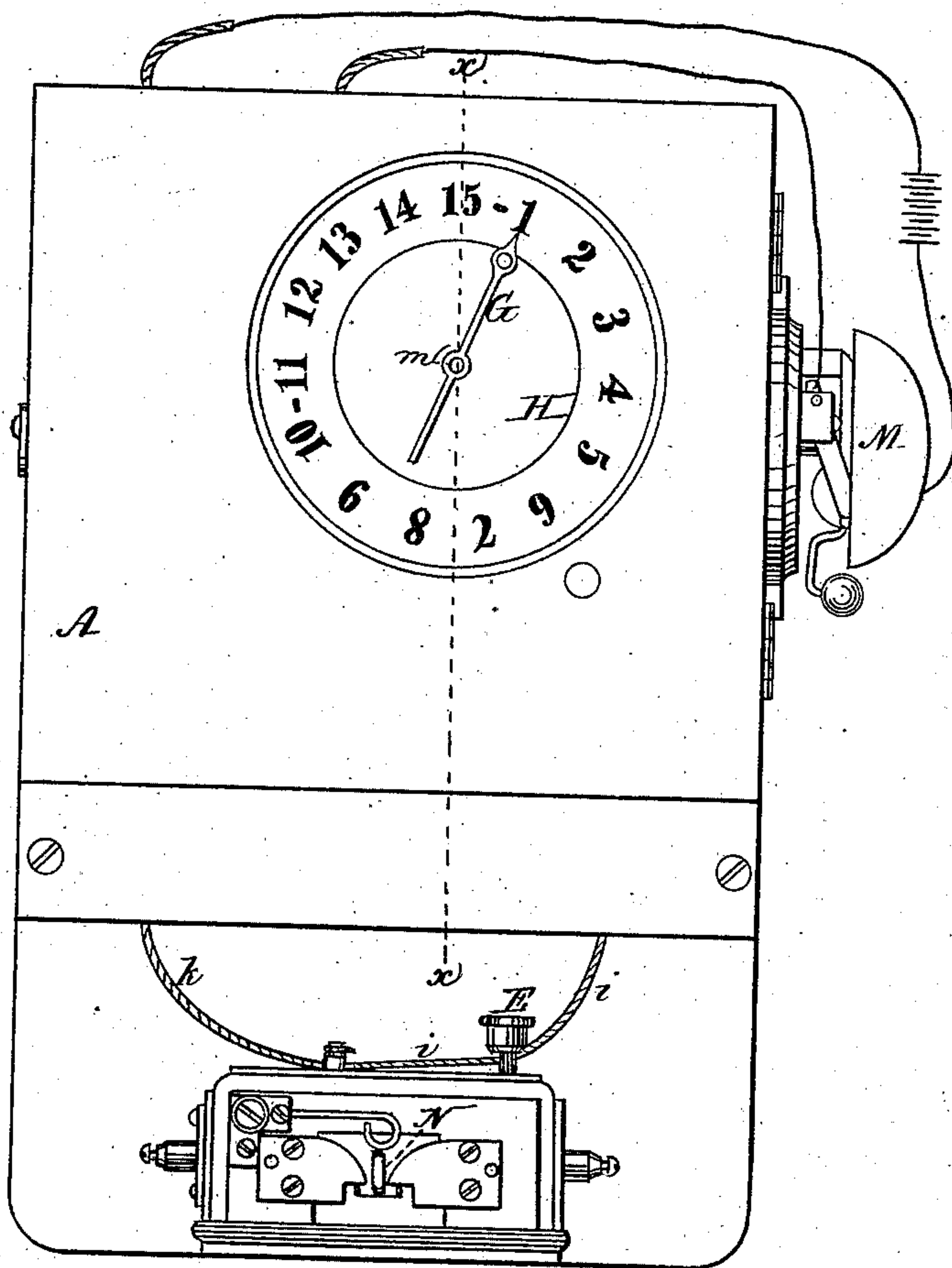


Fig. 4

Witnesses;  
W. J. Cambridge  
Chas. E. Griffin

Inventor,  
Charles S. Eaton  
per J. E. Tschernacher  
Atty

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Fig. 2

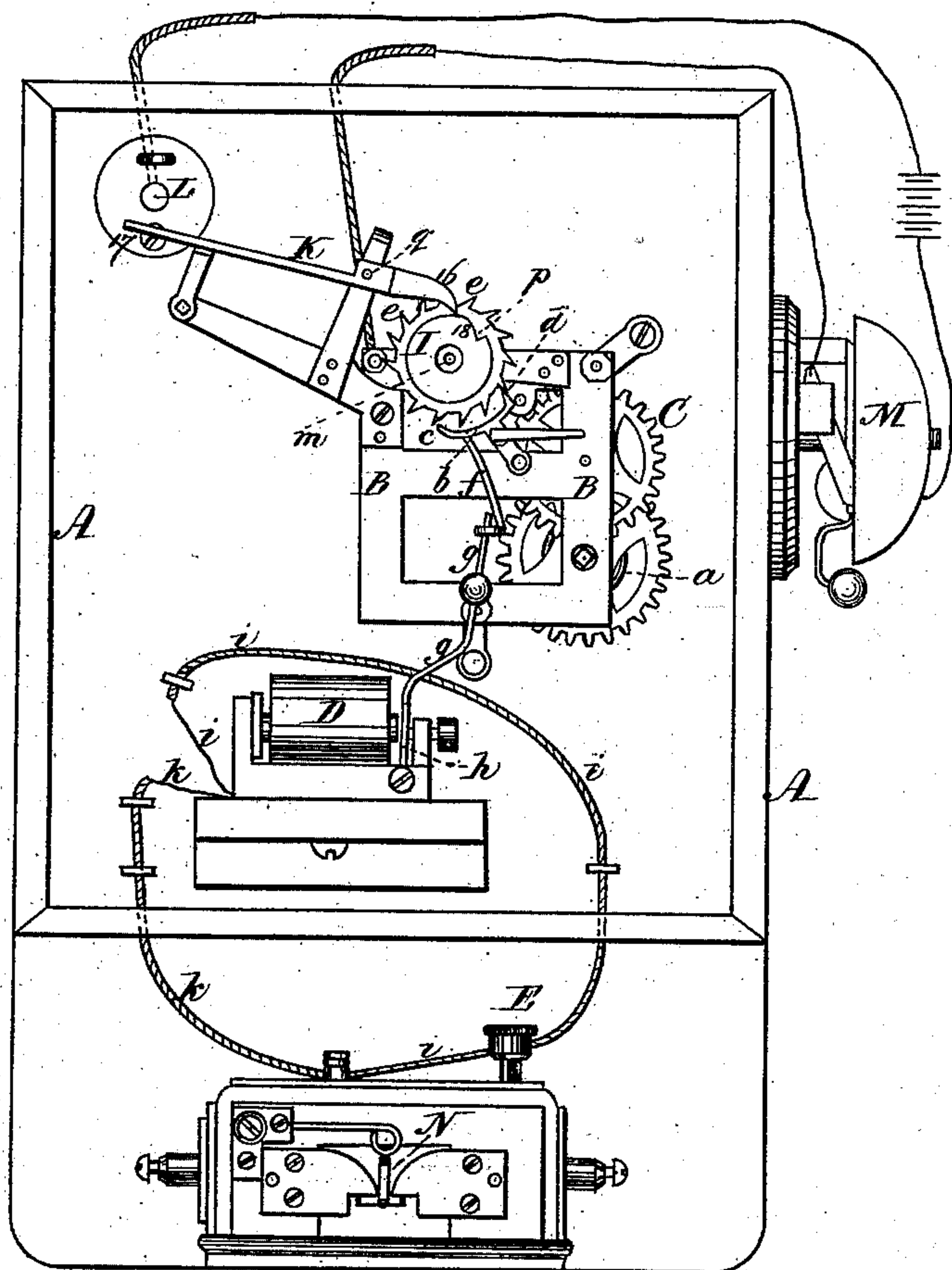
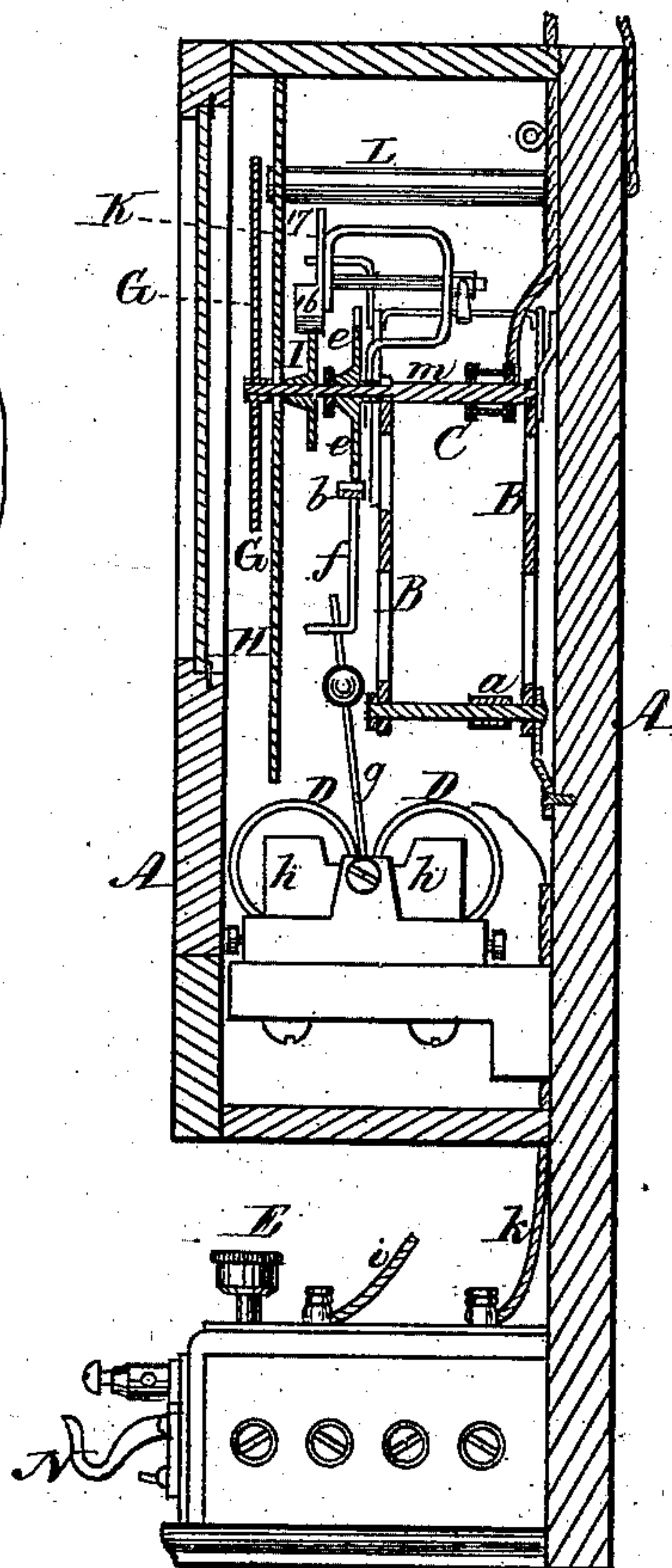


Fig. 3



Witnesses;  
W. J. Cambridge  
Chas. E. Griffin

Inventor,  
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per P. E. Teschemacher  
Att'y



# UNITED STATES PATENT OFFICE.

CHARLES S. EATON, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO HIMSELF,  
CYRUS C. PICKERING, EDWIN LAMSON, AND EARL A. THISSELL, OF  
SAME PLACE.

## ELECTRIC CALL FOR TELEPHONES.

SPECIFICATION forming part of Letters Patent No. 228,047, dated May 25, 1880.

Application filed January 3, 1880.

*To all whom it may concern:*

Be it known that I, CHARLES S. EATON, of Lowell, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Electric Call or Signaling Apparatus for Telephones, Telegraphs, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a front elevation of my improved call or signaling apparatus. Fig. 2 is a front elevation of the same, the dial and a portion of the casing being removed to show the interior construction. Fig. 3 is a vertical section through the same on the line *x x* of Fig. 1; Fig. 4, detail enlarged.

Where a number of telephones are included within a single electrical circuit, as heretofore, and the operator at one station wishes to communicate with another station, he sounds on the electric signal or call-bell of the receiving-station the number by which it is designated to call the attention of the attendant at that station. As, however, the signal-bells of all the stations are in the same circuit, the signal is sounded simultaneously at every station, which is found to be a great annoyance on account of the frequent ringing of the bells and the necessity of the attendant at each station being constantly on the alert in order to distinguish the different signals and recognize that of his station, so as to know when it is called.

To avoid this simultaneous ringing of all of the signal-bells of the different stations and to cause only the bell at the particular station to which the message is to be sent to be sounded, while all the others remain silent, is the object of my invention, which consists in certain novel devices for effecting the desired result, as will be hereinafter fully set forth.

In the said drawings, A represents a casing, within which is secured the frame B of a train of clock-work, C, which is actuated by a spring, *a*, and is provided with a "dead-beat" escapement.

The plate *b*, which carries at its ends the

pallets *c d*, which engage with the teeth of the escapement-wheel *e*, is provided with a rod or wire, *f*, which is attached to its under side, and is vibrated by an arm, *g*, projecting up from the armature *h* of an electro-magnet, D, the upper end of the arm *g* passing through a loop at the lower end of the rod *f*.

The electro-magnet D is secured upon a suitable shelf within the casing A, and has its coils connected with the main-line wire by the wires *i k*, so that it can be operated from any of the stations within the circuit in which the instruments are placed, including its own station, by means of a suitable key, E, at each station, to cause the armature *h* to be vibrated in the usual manner. Each movement of the armature *h* in either direction causes or allows the escapement-wheel *e* to rotate a distance equal to half that between two of its contiguous teeth, and by the employment of a dead-beat escapement when the armature *h* is drawn away from the magnet the pallet *d* will catch and hold the tooth which bears against it and prevent the escapement-wheel from again moving until the rod *f* is vibrated in the opposite direction by the attraction of the armature to the magnet, and thus as the electro-magnet D is operated the escapement-wheel *e* is caused or allowed to revolve intermittingly, for a purpose to be hereinafter described.

To the outer end of the arbor *m* of the escapement-wheel *e* is secured an index-hand or pointer, G, which moves over a dial, H, bearing on its face the numbers of the telephone-stations in the circuit and certain other numbers to be referred to hereinafter, the numbers on the dial corresponding to the number of teeth of the escapement-wheel *e*—that is, one tooth for each number on the dial. Upon the arbor *m* is also secured a wheel or disk, I, provided with a notch, *p*, and against the periphery of the disk I rests one end, 16, of a nearly-balanced lever, K, having its fulcrum at *q*, the opposite end 17 of this lever being so placed as to come into contact with a metallic stud or post, L, when its end 16 is allowed to drop to, or nearly to, the bottom of the notch *p* in the disk I, this contact of the end 17 of the lever K with the stud L com-



pleting a local circuit, in which the call-bell M is included, and giving an alarm to notify the attendant that it is desired to communicate with his station.

5 The notch *p* of the disk I is so placed with respect to the index-hand G and dial H that the end 16 of the lever K will drop into it to close the bell-circuit and give the alarm only when the index-hand points to a particular  
10 part of the dial corresponding to the number of the station to which the instrument belongs; and to close the bell-circuit when the hand is in the position referred to, the operator at the transmitting-station must keep the key E depressed a sufficient length of time to give the  
15 end 16 of the lever time to drop to, or nearly to, the bottom of the notch *p*, so that its opposite end 17 will strike the stud L; otherwise the call-bell will not be rung. When, however,  
20 the operator removes his finger from the key E, allowing it to rise, the circuit through the electro-magnet D is closed, and the disk I is rotated sufficiently to raise the end 16 of the lever K out, or nearly out, of the notch *p*, and  
25 thus open the bell-circuit and stop the ringing of the call-bell M.

When the notch *p* of the disk I is carried rapidly past the end 16 of the lever K, which is effected by releasing the key E instantane-  
30 ously after each depression, the end 16 will not have time to drop into the notch *p* sufficiently far to bring the other end, 17, of the lever into contact with the stud L, but will be caught by the inclined portion 18 of the notch  
35 *p* and again raised up before the end 17 can come into contact with the stud, and consequently the call-bell M will not be sounded. This rapid movement of the notch *p* of the disk I past the end 16 of the lever K will oc-  
40 cur when some other station in the circuit is being called, which will necessitate the revolving of the notch *p* past the end 16 of the lever; and thus it will be seen that only the call-bell at the particular station with which  
45 it is desired to communicate is rung, while all the other bells in the circuit will remain silent, whereby the annoyance caused by the frequent ringing of the bells is avoided and no atten-  
50 tion is needed on the part of the operator at any station until he hears his call-bell or alarm sounded, when he knows that a communication with him is desired.

The escapement-wheels *e* of the several instruments in the circuit all revolve in unison,  
55 together with the index-hands, which are all set to point simultaneously to the same number on their respective dials, and when the operator at any station wishes to communicate with another station in the same circuit—for  
60 instance, No. 6—he manipulates the key E (taking care to release it instantaneously after each depression) until the index-hand G points to number 6 on the dial, at which time the key will be up. He then again depresses the key,  
65 this time holding it down with his finger, which moves the index-hand to a point midway between 6 and 7 and brings the notch *p*

of the disk I of the instrument at the receiving-station under the end 16 of the lever K, which will then drop therein, owing to the  
70 arbor *m* remaining stationary by reason of the continued depression of the key E at the transmitting-station, which causes the call-bell at station 6 to ring the alarm in the manner previously described, this ringing continuing as  
75 long as the operator at the transmitting-station keeps his key E depressed. As soon, however, as he thinks a sufficient alarm has been sounded he removes his finger from the  
80 key E, which produces a movement of the arbor *m* and causes the end 16 of the lever K of the receiving-station to be raised out or partly out of the notch *p*, thus opening the bell-circuit and stopping the alarm.

The operator at the transmitting-station  
85 then, by means of his key E, moves the index-hands G of the several instruments in the circuit round to a predetermined number on the dials which has no station assigned to it—for instance, 10—so that when the hand points to  
90 this number it will indicate to all the other stations that the line is in use. The operator at the receiving-station then, by means of his key E, rotates the index-hands G round to another unassigned number—for instance, 15—  
95 and then opens or breaks the electric circuit in which the electro-magnets D are placed (as is necessary in using a Bell telephone) by means of a suitable switch, N, or by depressing the key E and retaining it in that posi-  
100 tion, which will cause the hands G to move half-way to the next number—in this case 1—and when the operator at the transmitting-station sees the hand pointing between 15 and the next number in advance, 1, he knows  
105 that the circuit is open and that the operator at the receiving-station is ready to talk.

When the conversation has been terminated the circuit is closed by both of the operators moving the switch N of their respective instru-  
110 ments, or allowing the key E to rise, which causes the armatures of the electro-magnets D to be attracted and the index-hands G to move from the position midway between 15 and 1 to 1, which indicates to all of the sta-  
115 tions that the line is free and ready for use.

When, however, an operator at any station goes to his instrument and finds the hand pointing to 10 or 15 he knows that the line is in use, and must therefore wait until the hand  
120 indicates that the line is again free.

I do not confine myself to the use of the notched wheel I and lever K, as it is evident that some other device may be used in connection with the rotating arbor *m*, which will set  
125 the alarm mechanism in action when the arbor *m* is held stationary for a sufficient length of time with the hand pointing to the number or mark on the dial corresponding to its own station.

130 Instead of an electric call-bell, a clock-alarm mechanism may be employed, if preferred, and in lieu of employing a train of clock-work and a spring or weight in connection with an elec-



tro-magnet, D, to rotate the arbor carrying the device for setting the alarm mechanism in action, the arbor may be rotated by a ratchet-wheel and pawl or pawls, or other mechanism 5 connected directly with the vibrating armature *h* of the electro-magnet.

Instead of attaching the index-hand G and notched disk I to the arbor *m* of the escapement-wheel *e*, it is evident that they may be 10 attached to some other arbor properly connected with and revolved by the train of clock-work without departing from the spirit of my invention.

What I claim as my invention, and desire 15 to secure by Letters Patent, is—

1. In an electric call-signal apparatus, the arbor *m*, provided with an index-hand, G, and caused or allowed to rotate intermittingly by the action of an electro-magnet, D, capable of 20 being operated from any station in the electric circuit, in combination with a dial, H, bearing the numbers of the stations in the circuit, and a device or mechanism having a retarded movement and controlled by the arbor *m*, for 25 setting in action the call-bell or alarm mechanism when the arbor is arrested and held stationary for a sufficient length of time, with the index-hand pointing to the number upon or part of the dial designating the station to 30 which the instrument belongs, substantially as set forth.

2. In an electric call-signal apparatus, the intermittingly-rotating arbor *m*, provided with an index-hand, G, and a disk, I, having a notch, 35 *p*, in combination with the dial H and the lever K, having a retarded movement and controlled by the arbor *m*, for setting in action the

call-bell or alarm mechanism when the end 16 of the lever is allowed to drop down into the notch *p*, substantially in the manner and for 40 the purpose described.

3. In an electric call-signal apparatus, the clock-work C, operated by the electro-magnet D from any station in the circuit by means of a key, E, for the purpose of producing an inter- 45 mittent rotation of the arbor *m*, in combination with the hand G, dial H, notched disk I, and lever K, having a retarded movement and controlled by the arbor *m*, or equivalent mechanism, for setting in action the call-bell or 50 alarm mechanism, substantially as described.

4. The combination, in an electric circuit, of a series of three or more call-signal instruments, each consisting essentially of an arbor, *m*, rotated intermittingly, as described, and 55 provided with a hand, G, moving over a dial, H, an electro-magnet, D, capable of being operated by means of the key E of any station in the circuit to cause or allow the arbor *m* to rotate, and a means for setting in action the 60 call-bell or alarm mechanism having a retarded movement controlled by arbor *m* when the arbor is arrested and held stationary for a sufficient length of time, with the hand pointing to a given number or part of the dial, all 65 constructed to operate together substantially in the manner and for the purpose set forth.

Witness my hand this 1st day of January, A. D. 1880.

CHARLES S. EATON.

In presence of—

P. E. TESCHEMACHER,  
W. J. CAMBRIDGE.