(No Model.) 2 Sheets—Sheet 1.

A. GIPPERICH.

TELEGRAPH SYSTEM.

No. 486,332. Patented Nov. 15, 1892.

Fig. 1.

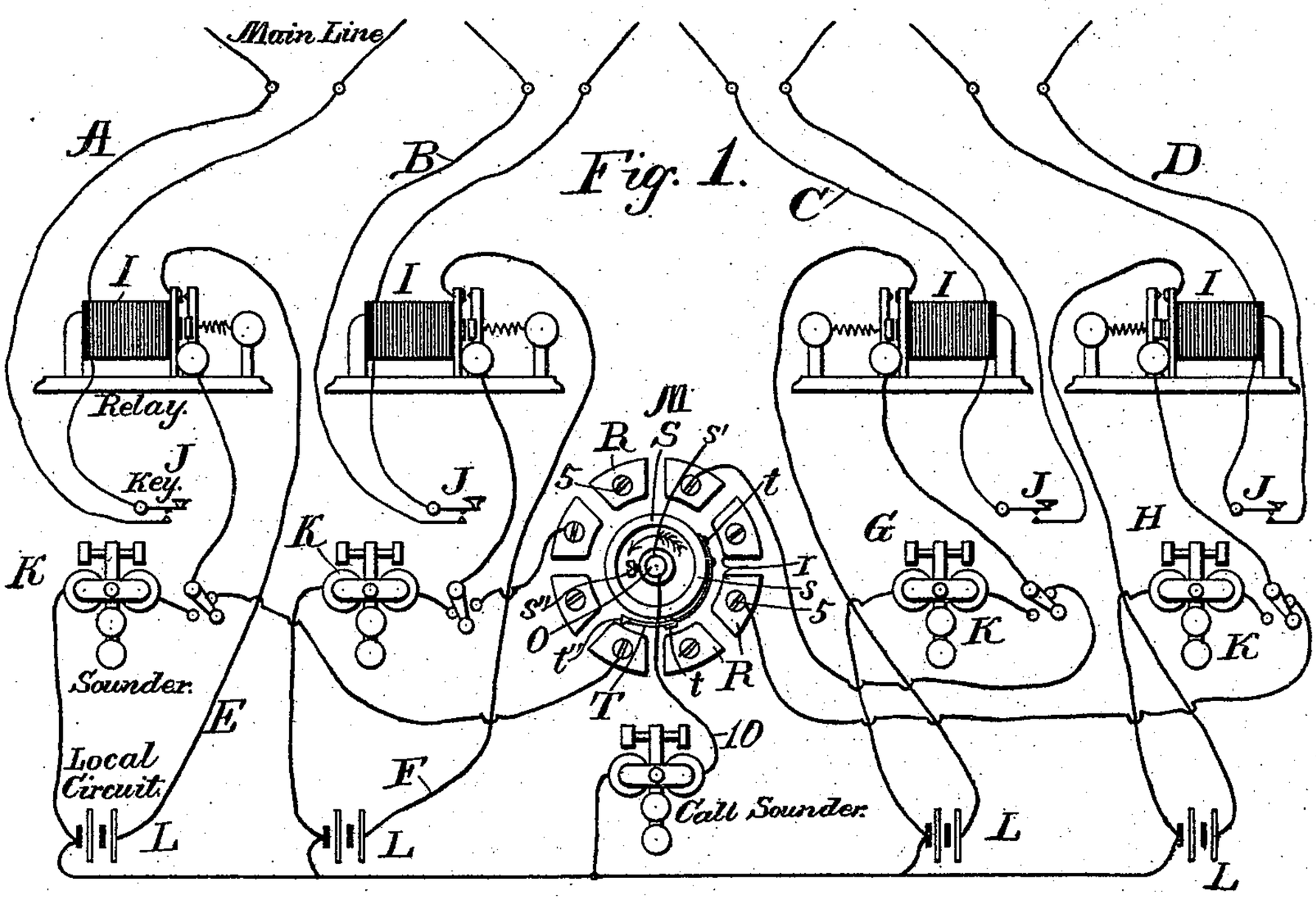
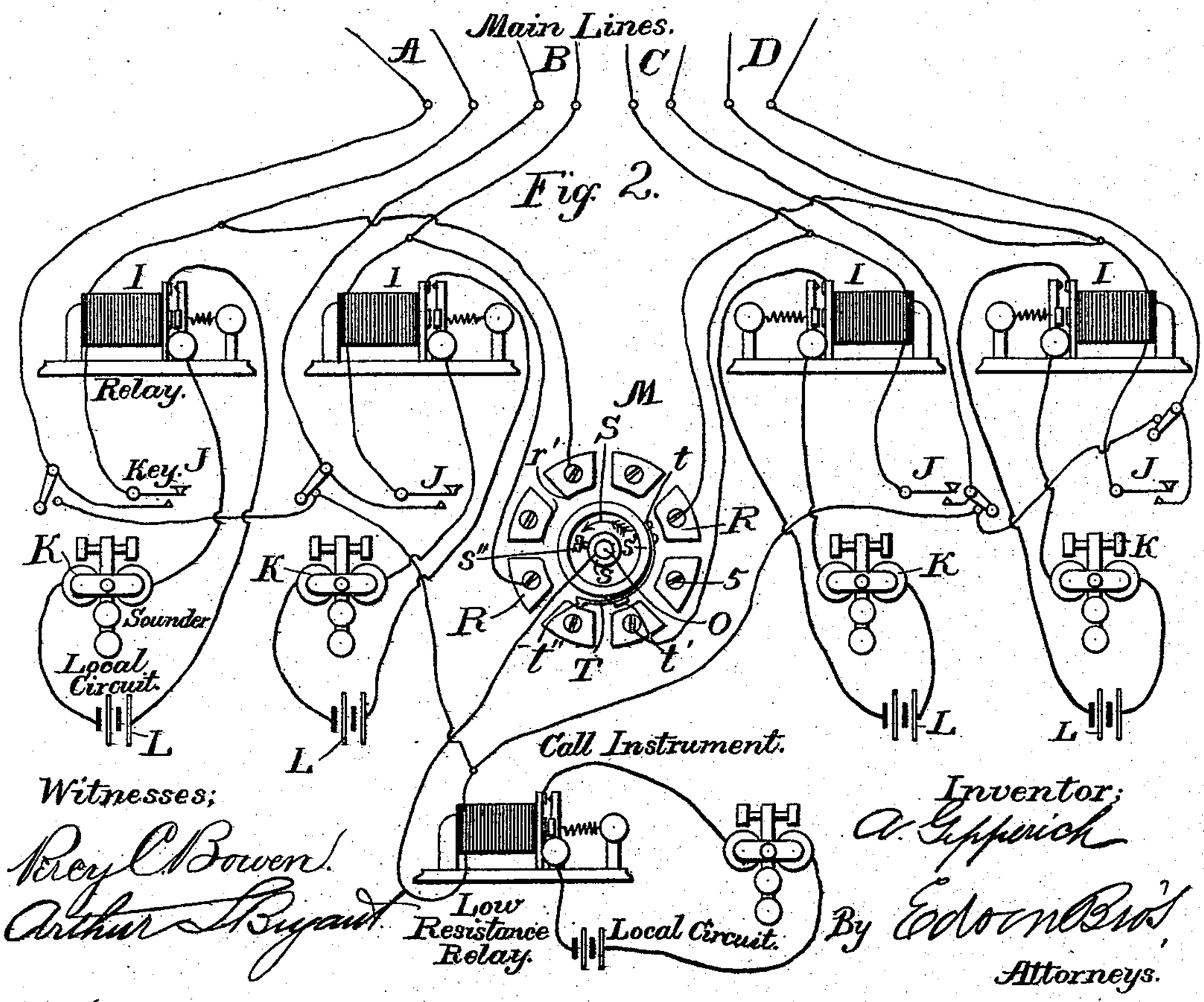


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

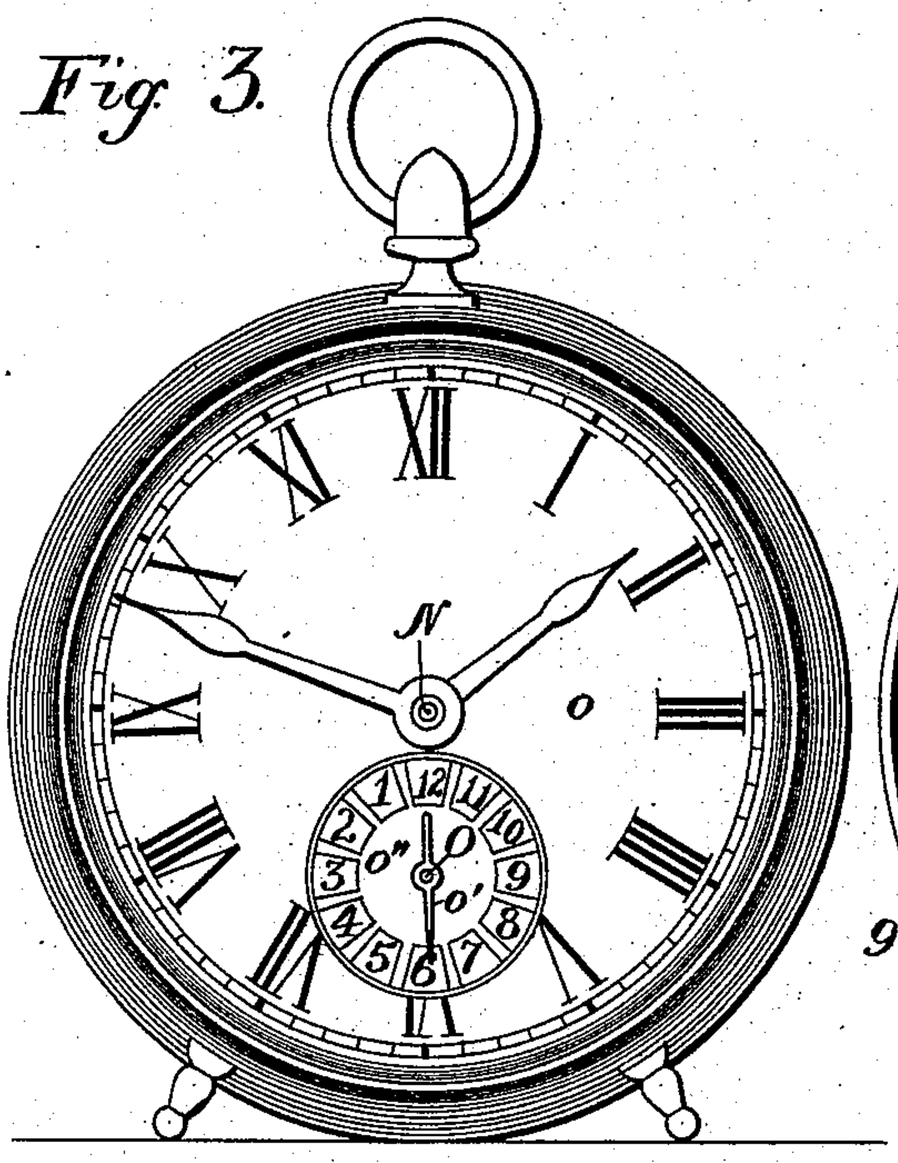


Fig. 4.

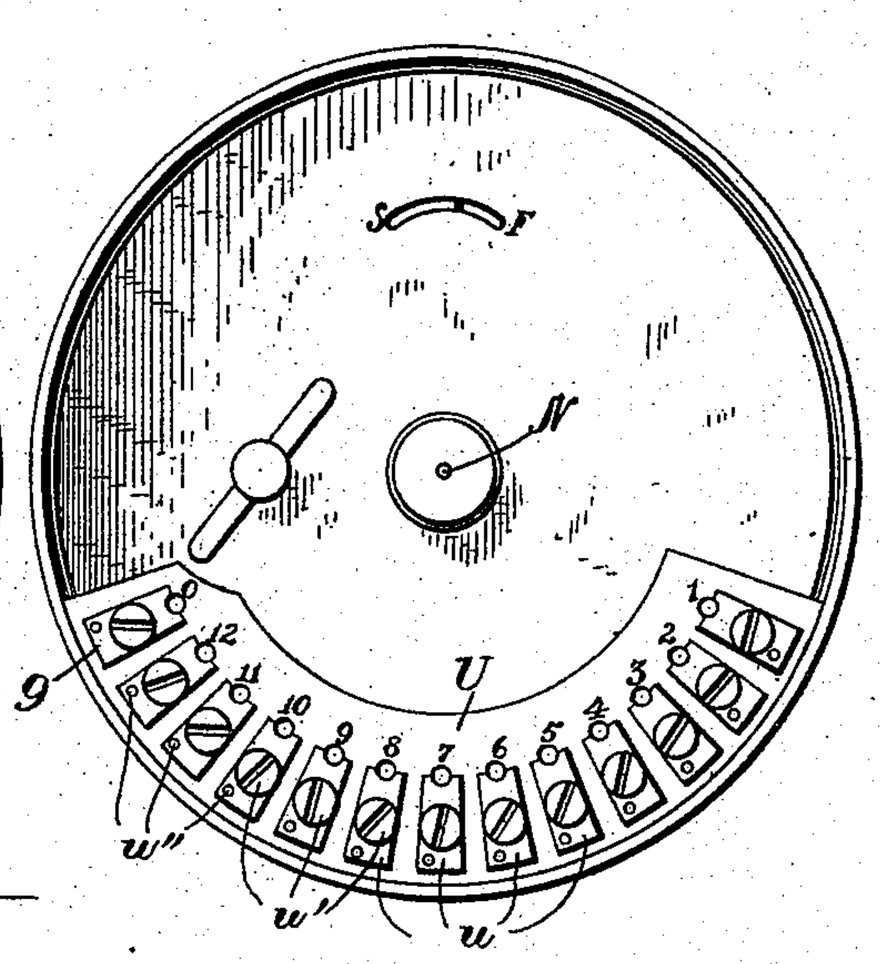


Fig. 5.

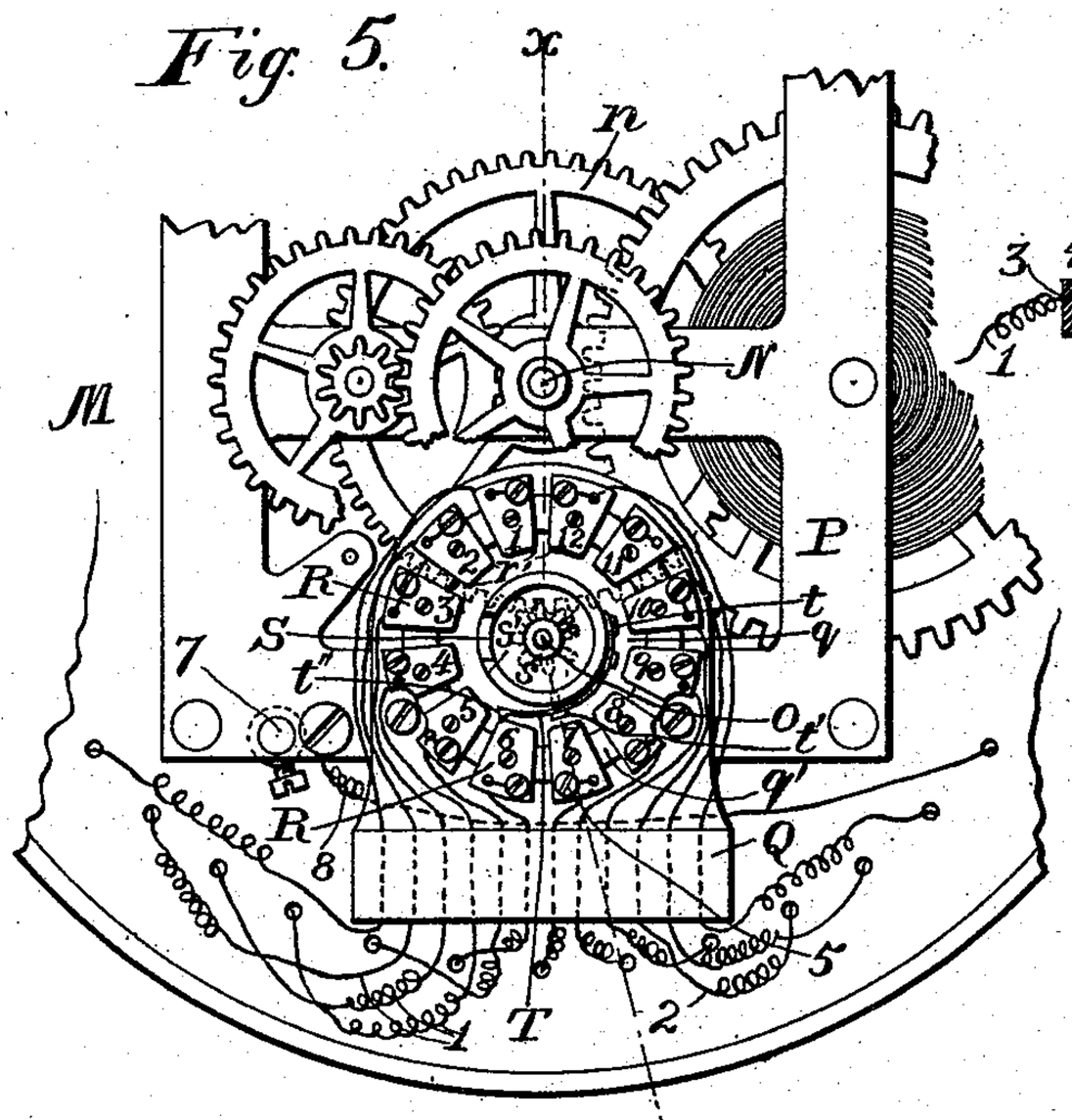
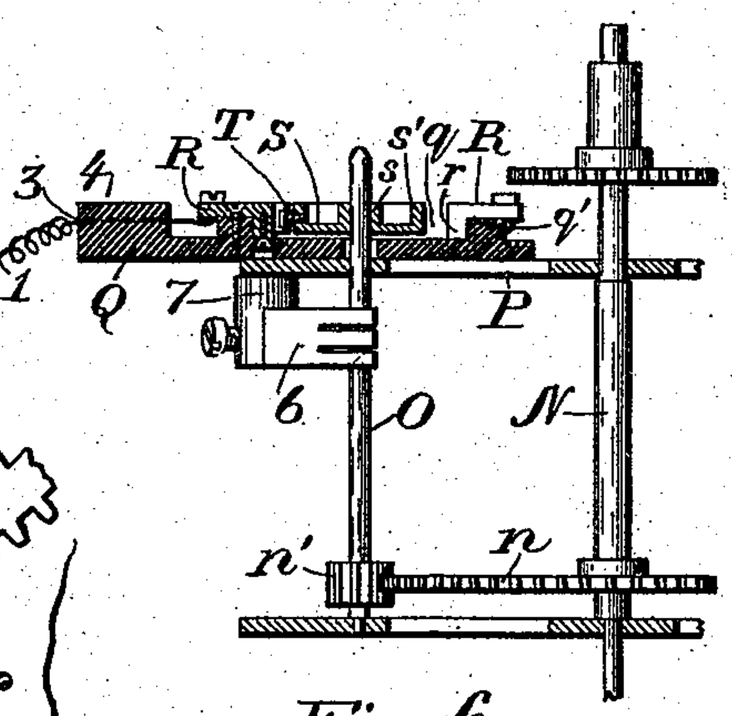


Fig. 6.



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UNITED STATES PATENT OFFICE.

ADOLPHUS GIPPERICH, OF RICHMOND, VIRGINIA.

TELEGRAPH SYSTEM.

SPECIFICATION forming part of Letters Patent No. 486,332, dated November 15, 1892.

Application filed July 30, 1892. Serial No. 441,740. (No model.)

To all whom it may concern:

Be it known that I, ADOLPHUS GIPPERICH, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Signal and Switch Mechanism for Telegraph Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to a signal and switch mechanism designed for use in connection with a series of telegraphic main lines and their corresponding local circuits; and the object of the invention is to permit all of the main-line circuits leading into a central station or operating-room, or as many of said circuits as may not be in use or under observation of an operator, to pass through the signal and switch mechanism, which is set in motion by a suitable time or other propelling mechanism and is adapted to open and close in rotation each of said main-line circuits and thereby connect and disconnect the same with a single call instrument which at all times is under the observation of an attendant.

The different main-line circuits which may be switched in or out of circuit with the automatic switch and signal mechanism of my invention have each their respective number, by which they are known, and have their corresponding station and number in said apparatus with which they are automatically brought into the circuit. The particular station of each main-line circuit is connected in circuit with the call instrument, and each station of said main-line circuits is adapted to be indicated on the dial of the signal mechanism by a suitable index pointing to a corresponding number on the dial of said signal, whereby the attendant detailed for observation of the automatic switch and signal is at all times in position to communicate to the operators in the central office or station the number of the main-line that desires to communicate with said office.

With these ends in view the invention consists in the combination of a series of stations or sections to which the main-line conductors are electrically connected and a rotary contact adapted to be propelled by any suitable form of prime-moving or time mechanism and adapted to make successive contact with each of the main-line contacts once in every revolution thereof, and a call-sounder in electrical circuit with the rotary contact and adapted to give an audible signal each time either of the main-line circuits is closed by the operator at an outlying station to give notice to the attendant at the central station that he desires to communicate, the number of such main-line circuits that has communicated with the central office being indicated by the index on a dial of the signal mechanism, whereby the attendant can ascertain by a glance at the dial of the signal the number of such main-line circuits and communicate that fact to the operator at the key of the corresponding local circuit.

The invention further consists in the novel combination of devices and peculiar construction and arrangement of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings I have illustrated my invention by Figures 3, 4, 5, and 6 in connection with a common well-known form of timepiece employing a coiled spring as its motive power and suitable anchor-escapement for controlling or regulating the motion of the mechanism; but I would have it understood that I do not confine myself to this particular form of means for imparting motion to the rotary contact, as I am well aware that any other form of motor may be used for propelling said rotary contact—as, for instance, a motor may be used which employs a weight or electrical energy for its motive power—or any form of speed-regulating mechanism may be used in connection with such motor.

The switch and signal mechanism may be embraced in the local circuits employed in connection with the main-line circuits, as indicated by Fig. 1 of the drawings, or said mechanism may be included directly in the main-line circuits, as in Fig. 2; but I prefer to embrace said switch and signal mechanism in the local circuits, as such connection leaves the main-line circuits entirely clear and free from interruption or interference with one another.

In said drawings, Fig. 1 is a diagrammatic

view illustrating the switch and signal mechanism in a series of local circuits. Fig. 2 is a small diagrammatic view showing the switch and signal mechanism included directly in the main-line circuits. Fig. 3 is an enlarged front view showing the dial of the switch and signal mechanism applied to a timepiece. Fig. 4 is a rear elevation of the timepiece, showing the means employed for connecting the main-line and sounder conductors in circuit with the switch and signal mechanism. Fig. 5 is an enlarged view, in elevation, of the working parts of the switch and signal mechanism; and Fig. 6 is a cross-sectional view through the same on the line *x x* of Fig. 5.

Like letters and numerals of reference denote corresponding parts in the several figures of the drawings, referring to which—

A, B, C, and D designate a series of main-line circuits leading into an operating-room or central station, and E F G H their corresponding local circuits. As is usual, each main line includes a relay I and a key J, and each local circuit is connected with the relay of its corresponding main line and it embraces a sounder K and a local battery L, all of which parts are of the usual construction and arrangement familiar to those skilled in the art to which this improvement appertains.

Although I have only illustrated and described four main lines and a like number of local circuits, yet it is to be understood that my invention is not confined to this particular number of main-line and local circuits, as any desired number of circuits can be connected with the signal and switch mechanism M, the construction of which will now be described in detail.

In adapting my improvements to a timepiece such as shown in Figs. 3, 4, 5, and 6 of the drawings I provide the center shaft N of the clock-movement with a drive-wheel *n*, having ninety-six teeth, (or any other desired number of teeth,) and this wheel meshes directly with a pinion *n'* of eight teeth or leaves, (or any desired number,) so that said pinion turns from the right hand toward the left hand. This pinion *n'* is rigidly fastened to a carrier-shaft O, which extends through the dial *o* of the timepiece, and the outer end of this shaft O carries an index or pointer *o'*, which is adapted to traverse the dial *o''* on the dial *o* of the timepiece, which dial *o''* is divided into a series of spaces containing numerals which correspond to the numbers given to the main line for the purpose of identifying the same.

On the frame P of the timepiece I secure an insulating support or block Q, which sustains the stations or sections to which the main-line conductors are electrically connected. The base or support Q is made of hard rubber, wood, bone, or other insulating matter and is rigidly secured in any suitable manner to the frame P—as, for instance, by screws, as shown. This insulating base or support is provided with a circular recess or depression *q*, and the face of the base is partially cut away to leave an annular flange *q'*, standing around and concentric with the annular depression or recess, and in this annular recess is fitted the series of metallic plates R, forming the stations or contacts of the main-line circuits. These metallic stations or contacts R are fixed to the face of the annular flange *q'* of the insulated support or base Q by means of screws, as shown, and each contact-station has a lip or flange *r*, which extends into the recess or depression *q*, so as to be in the path of the rotary contact S on the carrier-shaft O of the switch and signal mechanism. This rotary contact S is made in the form of a disk or plate turned quite thin, so as to be light and yet have sufficient body to impart the necessary strength thereto, and said disk has a central hub *s* and a peripheral annular flange *s'*. The hub of the contact S is fitted friction-tight on the carrier-shaft O and secured rigidly thereto by means of a clamping-screw *s''*. This rotary contact carries a yielding or spring arm T, which is arranged outside of the body or disk of said contact, and said arm is arranged nearly concentric with the disk, but is adapted to span or extend across the narrow space intervening between the body or disk of the rotary contact and the fixed contact-stations R of the main-line circuits, so that the free end of said arm T is adapted to ride or bear against the fixed contact-stations R and make electrical connection therewith successively as the rotary disk is turned. One end of this spring-arm is fixed rigidly to the peripheral flange of the rotary contact by means of a screw or rivet at *t*, and the play or movement of the spring-arm relatively to the rotary contact is limited by means of a headed pin or screw *t'*, which passes through a slot or opening formed in the spring-arm at a point between its ends, and which pin or screw is fixed in the peripheral flange of the rotary contact. To insure good electrical contact between the point of the spring-arm and the fixed contact-stations, I split or divide the free end of said spring-arm and provide said split end with tips *t''* of platinum or other good electrical-conducting material, and to enable the spring-arm to ride clear of one fixed contact-station before said end of the spring-arm comes in contact with the adjacent fixed contact-station I bevel or incline the opposing edges of said fixed contact-stations of the main line, the bevels being indicated at *r' r'* in Fig. 6.

As shown in Fig. 5 of the drawings, the contact-stations R of the main lines are arranged in the form of a circle, of which each plate R forms a segment, and said contact-stations are spaced or arranged so as to leave intervening spaces between the contact-stations which are thus entirely independent of each other, and by thus spacing and arranging the contact-stations R the rotary contact S is adapted to make electrical connection with the same suc-

cessively during each rotation of the same and for the same period or length of time. Thus suppose the contact S makes a complete revolution once in every five minutes of time and there are twelve contact-stations R for a like number of main lines, the contact S will be in electrical connection with each station R for about fifteen (15) seconds of time, and about five (5) seconds of time is allowed for the contact S to travel the spaces between each pair of the fixed-contact stations R. Said rotary contact S is arranged flush in the annular cavity or depression in the insulated base or support, and it is of such diameter that its periphery is wholly free from contact with the stations R, thus leaving an intervening space between the rotary and fixed contacts, in which space the spring-arm T is adapted to travel as the rotary contact is propelled by the motor. The connection between the main-line conductors and the fixed-contact stations R of the switch and signal mechanism is secured by the following means:

On the back or rear side of the signal and switch mechanism is fixed a segemental block U, and to this block the main-line conductors are secured by means of the clamping-plates *u*, which bear on the naked ends of the main-line conductors, and each of which plates is rigidly held in place by the fastening-screws *u'* and by a steady-pin *u''*, which prevents edgewise displacement of said clamping-plates. The clamping-plates *u* of the main-line conductors are numbered to correspond to the fixed main-line contacts R in the switch and signal mechanism, and said plates *u* and the fixed contacts are connected electrically by a series of independent insulated conductors 1 2, which have their exposed naked ends held in electrical connection with the clamping-plates, while the other ends of the conductors are carried through perforations 3 in the raised flange 4 on one edge of the insulated base or support Q, said ends of the conductors being electrically connected to the main-line contacts R by means of the screws 5.

The circuit through the switch-signal mechanism is completed through the revolving contact S by means of the contact-brush 6, which has one end fixed to a suitable rigid post 7, supported on the frame of the machine, and the free end of this brush, which is made of elastic or spring metal, is forked or divided and bears directly on the carrier-shaft O, which has the revolving contact electrically fixed and secured thereto, and which shaft extends through a suitable opening in the insulating base or support Q. To the fixed end of the spring is electrically secured a conductor 8, which extends and is fastened to a clamping-plate 9, similar to the clamping-plates of the main-line conductors, and this conductor 8 is connected with a call-sounder 10, which is common to the series of main lines and local circuits.

In Fig. 1 of the drawings I have shown the switch and signal mechanism connected in circuit with the local circuits and the call-sounder; but in Fig. 2 a branch of each main-line conductor leads directly to the main-line contacts and the circuits are completed through a low-resistance relay and the local circuits. I prefer the connection and arrangement of the switch and signal shown in Fig. 1, as the main-line circuits are entirely independent and free for operation without interference from one another.

The operation of my invention is simple and may be described as follows: The carrier-shaft is propelled continuously in one direction by the motor, and the rotary contact is thus turned so that the spring-arm thereof bears successively on each of the main-line contacts R for a limited period of time. The local circuits when not in use are switched off, so that the current from the main lines when the latter are closed will pass through the switch and signal. When an operator from an outlying station desires to communicate with the operating-room or central office, his key is depressed to close the circuit, and the current passes through the relay and thence to the proper main-line contact R of the annular series of contacts. As the rotary contact turns its arm T is brought into engagement with the proper main-line contact, and the circuit is thus closed through the spring-arm, the rotary contact, its brush, and the local circuit, and instantly the call-sounder is operated to call the attention of the attendant to the fact that the outlying station desires to communicate. By a glance at the dial *o* the attendant is enabled to ascertain the number of the main line that the index or pointer on the carrier-shaft points to, and the attendant has only to call out the number of the main line to secure the attention of the proper operator, who immediately turns the switch, and the local circuit is closed, thus placing the outlying station in communication with the central office. As the rotary contact continues to turn the circuit is switched off automatically through the signal and the spring-arm of said contact successively makes the series of main-line contacts, remaining on each for a limited time, and thus either of the outlying stations can signal the attendant at the central station.

I am aware that changes in the form and proportion of parts and details of construction of the devices herein shown and described as an embodiment of my invention can be made without departing from the spirit or sacrificing the advantages of my invention, and I therefore reserve the right to make such changes and alterations as fall within the scope of my improvements.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a telegraph system, the combination of a series of main-line circuits having the terminal contacts thereof arranged in annular series, a call-sounder in the local circuits of

said main-line circuits, and the continuously-rotating contact normally in circuit with the call-sounders and arranged within said annular series of terminal contacts of the main-line circuits and having means whereby it makes contact for a limited time successively with each terminal contact during each complete revolution of said rotating contact, substantially as and for the purpose described.

2. In a telegraph system, the combination of a series of main-line circuits having the terminal contacts thereof arranged in annular series and each contact being independent of the other, a call-sounder in the local circuits of said main-line circuits, a rotating contact connected normally in circuit with the call-sounder and arranged within said annular series of the main-line terminal contacts, a brush carried by said rotating contact and adapted to successively ride upon said terminal contacts during each complete revolution of the rotating contact, and mechanism for positively driving the rotating contact in one direction continuously, substantially as and for the purpose described.

3. In a telegraph system, the combination, with a series of main-line circuits and their corresponding open local circuits, of a switch and signal mechanism common to the whole series of circuits, comprising the annular series of independent terminal contacts to which said main-line conductors are connected, a call-sounder connected in circuit with the local circuits, the continuously-rotating contact connected in circuit with the call-sounder and adapted to make contact successively with each of the terminal contacts, and a pointer movable with said continuously-rotating contact and pointing to characters on a dial, whereby the call-sounder gives the signal and closes a local circuit when an electric current passes over one main-line circuit and the pointer indicates said main-line circuit on the dial, substantially as and for the purpose described.

4. In a telegraph system, the combination, with a series of main-line circuits and their corresponding local circuits, of a switch and signal mechanism common to all of said circuits and comprising the recessed insulated support or base, the annular series of terminal contacts to which the main-line conductors are connected and which are fixed to said base, the continuously-rotating contact arranged in the recess of said base and carrying a yielding arm adapted to successively bear on said fixed terminal contacts during each complete revolution of said rotary contact, a call-sounder in circuit with the local circuits, and a brush connected with said call-sounder and bearing normally against the rotary contact or its shaft, as and for the purpose described.

5. In a telegraph system, the combination, with a series of main-line circuits and their corresponding local circuits, of a switch and signal mechanism common to said circuits and comprising the insulated base, the annular series of terminal contacts fixed on said base and having main-line conductors connected thereto, a continuously-rotating carrier-shaft having the rotary contact which is arranged within said annular series of terminal contacts for the main-line circuits, a pointer rigid with the carrier-shaft and adapted to traverse a dial, a call-sounder connected with the local circuits, and the brush normally bearing on the carrier-shaft and connected with said call-sounder, substantially as and for the purpose described.

6. In a telegraph system, the combination, with a series of main-line circuits and their corresponding local circuits, of a switch and signal mechanism common to said circuits and comprising the insulated base or support, the segmental terminal contacts fixed to said base in annular series and having the main-line conductors connected thereto, the central carrier-shaft having a pointer which traverses a dial, the rotary contact rigid with the carrier-shaft within said annular series of terminal contacts, the spring-arm secured to the rotating contacts and having means for limiting the play of its free end against said fixed terminal contacts, a call-sounder connected with the local circuits, and a brush in circuit with the call-sounder and normally bearing on the carrier-shaft, substantially as described.

7. In a telegraph system, the combination, with a series of main-line circuits and their corresponding local circuits, of a switch and signal mechanism common to all of the main-line circuits and comprising the insulated base or support having the independent clamp-plates fixed to one side thereof, the terminal contacts for the main-line conductors, connected independently with said clamp-plates and arranged in annular series on said base or support, the carrier-shaft having a pointer which traverses a dial, the rotary contact fixed to said carrier-shaft and provided with a yielding arm that bears against said terminal contacts successively, a call-sounder included in the local circuits, and a brush bearing on the carrier-shaft and connected to the sounder, substantially as described.

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

ADOLPHUS GIPPERICH.

Witnesses:
J. R. GOODWIN,
JULIAN F. SKELTON.