

(No Model.)

E. A. WOELK.

ALARM SIGNAL APPARATUS FOR TELEPHONE EXCHANGES.

No. 272,505.

Patented Feb. 20, 1883.

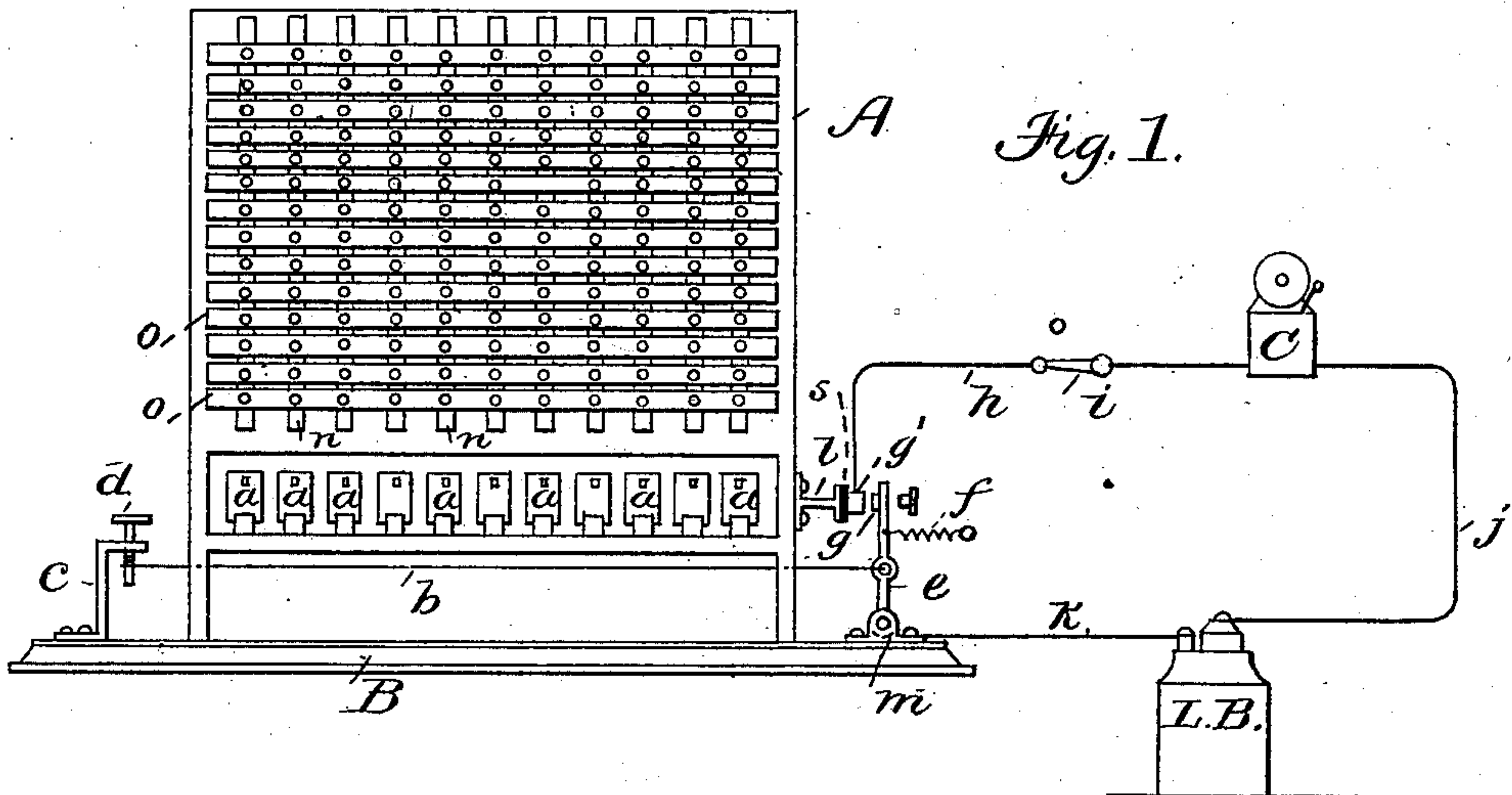


Fig. 2.

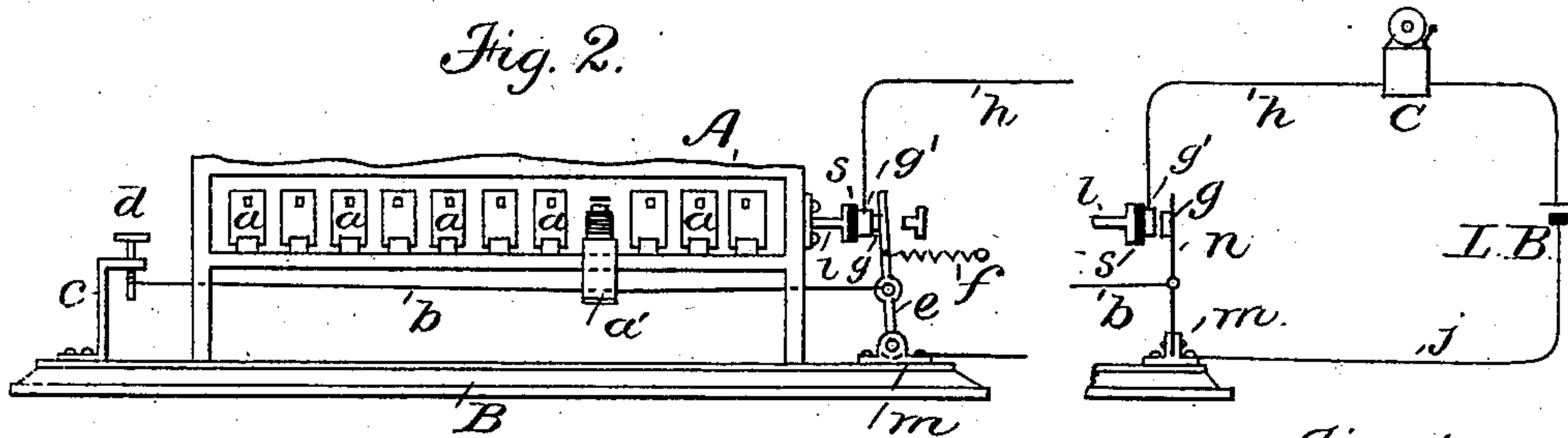
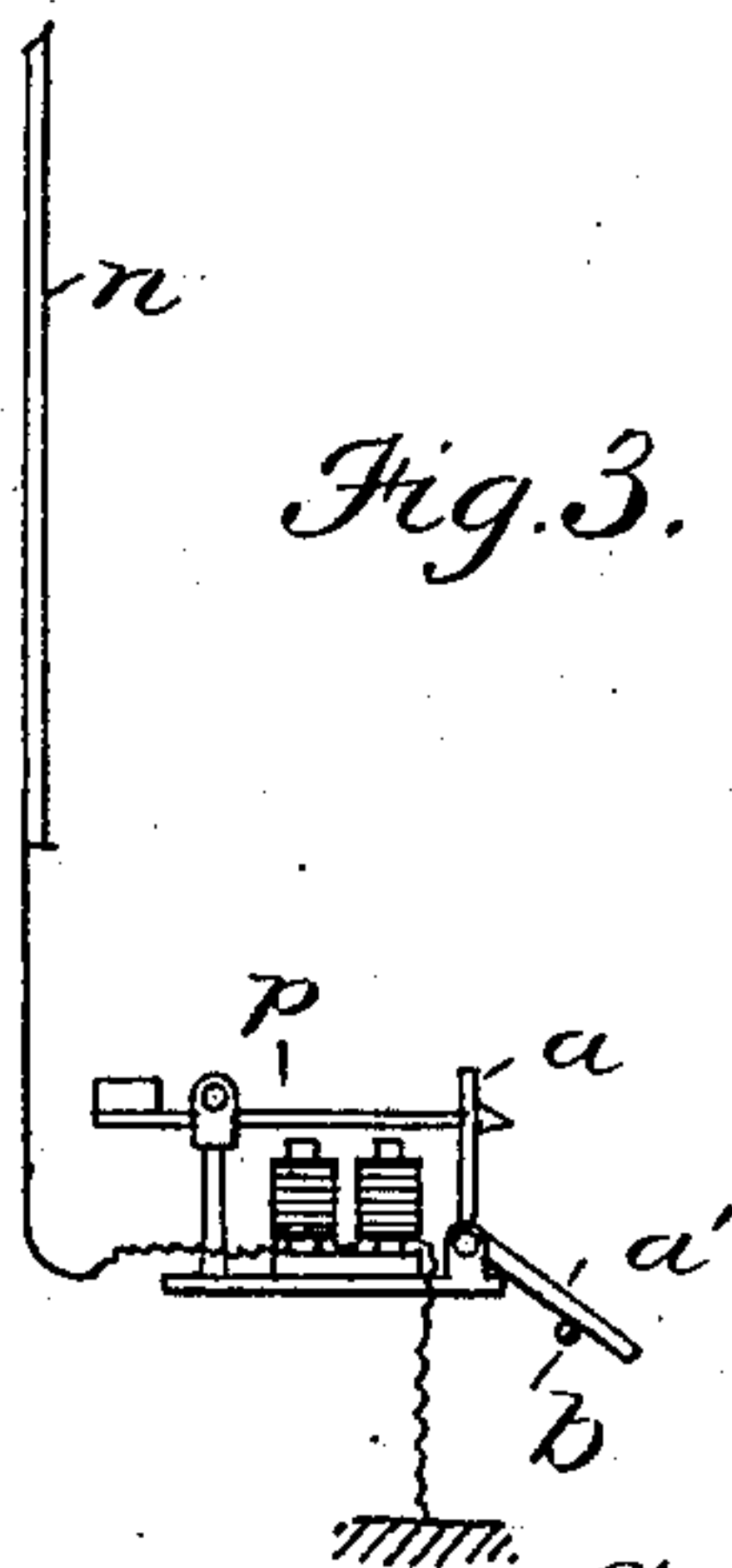


Fig. 4.

Fig. 3.



Witnesses.

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ALARM-SIGNAL APPARATUS FOR TELEPHONE-EXCHANGES.

SPECIFICATION forming part of Letters Patent No. 272,505, dated February 20, 1883.

Application filed November 29, 1882. (No model.)

To all whom it may concern:

Be it known that I, EDWARD A. WOELK, of Springfield, in the county of Greene and State of Missouri, have invented certain Improvements in Alarm-Signal Apparatus for Telephone-Exchanges, of which the following is a specification.

My invention is an improvement in telephone central-office apparatus; and its object is to provide an effectual and compact night-alarm, which, while retaining all the effectiveness of the alarms now in use, obviates the employment of a separate point of contact in the local circuit for each line, and thus eliminates a radical defect, and one which frequently militates against the satisfactory operation of the apparatus.

A large majority of the telephone-exchanges of the country are located in comparatively small centers of population, where one operator constitutes an entirely adequate day force. The calls for intercommunication occurring during the night in any exchange are but few in number compared with the business of the day, and in the smaller exchanges occur so rarely that the expense of a night operator is not warranted; yet it is also well known that when calls are received in the night they are frequently of the greatest urgency and importance, and it is therefore injudicious to close the central office at any time. To meet this emergency it becomes desirable to provide, in addition to the ordinary annunciator or visual signal, an alarm which, upon the reception of a call from any subscriber, gives an audible signal sufficiently loud to awaken a sleeping person, and when such provision is made the expense of maintaining the exchange-office always open may be materially lessened by allowing the person in charge to sleep, subject to the call of the audible signal or alarm. Heretofore such alarms have been constructed by arranging a metal rod or bar immediately below and in front of the annunciators and causing the said rod to become an extended terminal of a local battery, the circuit of which also includes an electro-magnet signaling device, usually a vibrating bell. The other battery-pole is connected by wire with the iron core of each and all of the annunciators. The ar-

rangement thus consists of a normally-open alarm-circuit with a circuit-closer at each annunciator, operating by the fall of the drop to close the circuit and cause the bell to ring. The objections to this device in practice are two: First, each contact is a source of weakness and a separate point requiring adjustment, care, and attention; second, the electrical union of all the cores of the annunciators by one of the battery-wires is liable to develop crosses between the different line-circuits if in the course of manufacture any portion of the insulation of the wire composing the annunciator-helices should be rubbed off or in any way become defective.

My invention overcomes both defects, and is also a much more portable device, being susceptible of removal in the day-time if its permanent presence is not desired.

It consists in constructing the alarm-circuit with but one point at which it is normally open, in providing a circuit-closer at said point with a constant tendency to remain open, and in the combination, with the said instrumentalities, of operating devices by which the fall of any of the annunciators actuates the single circuit-closer and causes the alarm-bell to ring.

In the drawings which accompany this specification, Figure 1 is a diagrammatic representation of my invention applied to a telephone switch-board, the alarm-circuit being open. Fig. 2 shows the invention in operation, with the circuit closed by the fall of an annunciator. Fig. 3 is a side view of the annunciator-drop in the act of operating the alarm; and Fig. 4 represents a modification of the circuit-closer, which, instead of being hinged as in Figs. 1 and 2, is shown as a flat spring rigidly fixed at its base, and tending to retain the circuit open by its own resiliency.

A is a telephone switch-board of any desired construction, and *a a* are the annunciators or visual signals thereof, each of which is connected in one of the line-circuits, which are understood to pass through the several vertical strips *n n* of the switch-board, thence through the annunciator electro-magnets and to earth, as in Fig. 3. During the day, when the operators are always present to receive and respond to calls, the visual signal given by the fall of the annunciator drop or shutter

a', Fig. 2, is always sufficient to attract attention. To cause an audible signal which shall have sufficient power to arouse a sleeping attendant, I construct an alarm-circuit as hereinafter described.

A metal lever, *e*, is pivoted to a standard or support, *m*, and at its upper end carries a contact-point, *g*. Opposite the contact-point *g* is a second contact-point, *g'*, which is fixed upon a base, *B*, screwed to any convenient place on or near the switch-board. The point *g'*, although fixed upon the base *B*, is insulated therefrom by the non-conducting medium *q*. From one terminal or pole of a voltaic battery, *L B*, a wire, *j*, is led to the electric bell *C*, and from the other pole a wire, *k*, runs to the standard *m* of the circuit-closing lever *e*. Continuing from the insulating contact-point *g'*, a wire, *h*, runs to the second binding-screw of the alarm-bell, the three wires *j*, *k*, and *h* constituting, together with the bell *C*, the battery *L B*, and the circuit-closer *e g'*, a local alarm-circuit, open normally by the separation of the points *g g'*, the bell *C* of course remaining inert so long as the said alarm-circuit is at any point incomplete. Included in the wire *h*, which unites the insulated point *g'* with the electric bell, is a button-switch, *i*, which may, during the day or when the bell is not required to ring, be turned so that the local circuit, besides being open at the circuit-closer, may also be open at the switch *i*, and thus prevent any accidental ringing of the bell, resulting from an inadvertent contact of the circuit-closing points *g g'*. The lever *e* works freely on its pivot in the standard *m*, and is maintained out of contact with the complementary contact-point *g'* by the retracting-spring *f*.

At the other side or end of the switch-board *A*, I place a standard, *c*, in which works an adjusting-screw, *d*, while *b* is a stout thread, string, piece of twine, or other suitable fiber, attached firmly to the pivoted circuit-closing lever *e* and stretching across the front of the switch-board to the adjusting-screw *d*, to which it is fastened, and by which it may be drawn tight, suffered to become loose and sag down, or subjected to any degree of tension. The thread or fiber (a fine flexible wire may be used, if preferred) is so disposed that when drawn tight it is stretched just in front of all the drops at a point in relation to their line of fall a short space above their point of rest when fallen, so that when any of the annunciator-drops fall it will necessarily fall upon the fiber and depress it to a degree proportionate to its normal tension. Moreover, as the fiber is attached to the lever *e* the latter is controlled thereby, and by its increased tension is drawn forward against the constant retracting-power of the spring *f* and caused to make contact with the point *g'*, closing the local circuit and ringing the bell *C*.

The operation of the alarm device is graphically shown in Figs. 2 and 3. The switch *i* being in place so as to complete the wire *h* to the bell, the string or fiber *b*, which, while the

alarm is unused, may be lowered down to the table or base *B* by means of the adjusting-screw *d*, must be tightened by the same screw to such a degree of tension that while the points *g g'* are not in contact a slight additional force upon the string will bring them into contact. This is the initial adjustment. When now a drop falls, indicating a signal from any distant point, its weight is sharply brought to bear on the fiber *b*, bending it from its horizontality. It thus becomes taut and draws up the lever *e* until the point *g* comes into contact with the point *g'* and closes the circuit.

Fig. 4 shows a modified method of fixing the lever *e*. Instead of pivoting it, as in Figs. 1 and 2, a flat metal spring may be used and rigidly inserted in the standard *m*. When this form is employed the retracting-spring *f* is not requisite, as the inherent resiliency of the spring-plate *n* serves the purpose of a retracting force.

If I so desire, I may attach the adjusting-screw standard *c* in such a manner as to be readily and easily detached when not in constant use—as, for example, by the use of a bolt and thumb-screw.

Having now fully described my invention, it is evident that I produce a loud audible signal, giving an alarm when a call is received from any of the lines, and that in the accomplishment of this end I employ but one electrical contact, and that thus I greatly reduce the possibility of defect and irregular operation, and that by the use of my invention all possibility of a cross between the different line-wires through the annunciator magnet cores is avoided.

I claim—

1. In a night-alarm for central telephone or district stations, the combination, substantially as hereinbefore described, of a series of main-line annunciators—one for each line-circuit—a normally-open local circuit including an electric alarm-bell, a circuit-closer, and a controlling device consisting of a string, fiber, or wire stretched in front of all the annunciators, and permanently united with and controlling the circuit-closer, whereby the fall of any of the annunciators increases the tension of the controlling devices and operates the circuit-closer.

2. An audible alarm-signal for telephone-exchanges, consisting of a series of annunciators in the several main-line circuits, an electric bell and circuit-closer in a local circuit, and a controlling device, substantially as described, adapted to be actuated by the fall of any of the annunciators, to operate the circuit-closer, for the purposes specified.

3. The combination in a telephone-alarm, of an electric bell and battery in a local circuit, a circuit-closer for the said local circuit, normally retracted by a spring or its equivalent, and thus maintaining the circuit normally open, one or more annunciators, each in a main line circuit, a device for controlling the circuit-closer, consisting of a string, fiber, wire, or

other tensile medium of motion, permanently attached at one end to the circuit-closer, and extending in front of the annunciators in the line of fall and above the point of rest of the drops thereof, whereby the fall of any of the drops upon the receipt of a signal tightens the controlling fiber and actuates the circuit-closer in opposition to the constant retracting force, and closes the local circuit, and an adjuster attached to the other end of the controller, adapted to vary and adjust the initial tension thereof, as described.

4. The combination of a normally open local alarm-circuit including a battery and alarm-instrument, a circuit-closer in the said circuit, and a retracting-spring therefor, with a fiber, string, or wire connected with the said circuit-closer, adjusting devices whereby the initial tension of the fiber is varied, and a series of annunciator-drops, each in a line-circuit, arranged in a line with the said fiber, and adapted upon the receipt of a signal over any of the line-circuits to strike the same, increase its tension by the strain thus produced, and there-

by close the local alarm-circuit, substantially as set forth.

5. The combination of two or more main-line circuits, a series of annunciators included therein—one for each circuit—a local alarm-circuit, normally open at a single point common to all of the main circuits, but having no electrical connection therewith, a single circuit-closer therefor, an electric bell or other loud-sounding electro-magnetic alarm, included in the said local circuit, and intermediate devices, substantially as indicated, whereby signals received upon any of the main circuits are enabled to operate the circuit-closer of the local circuit and give the alarm, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 3d day of November, 1882.

EDWARD A. WOELK.

Witnesses:

A. M. LAPHAM,

JOHN B. RUSSELL.