

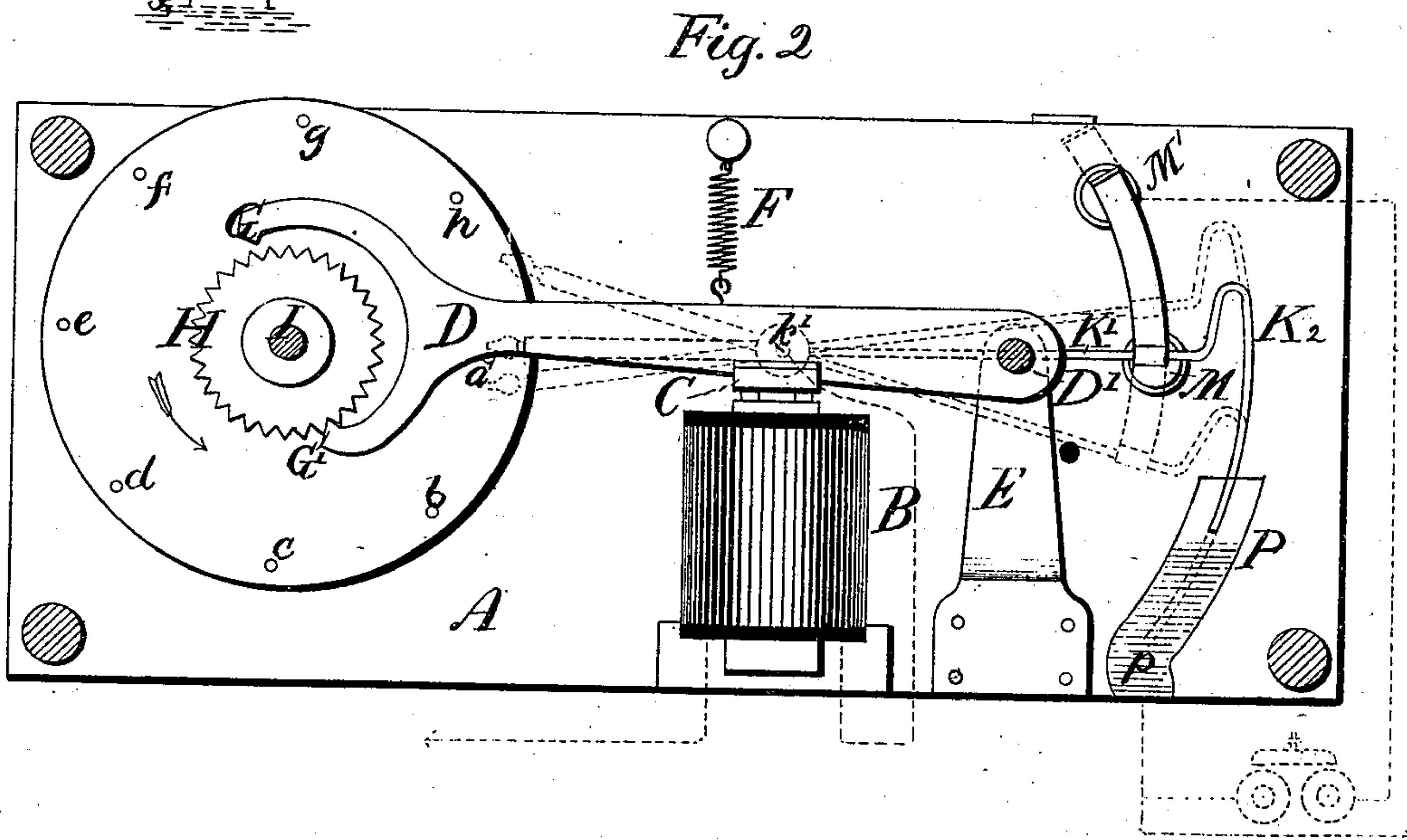
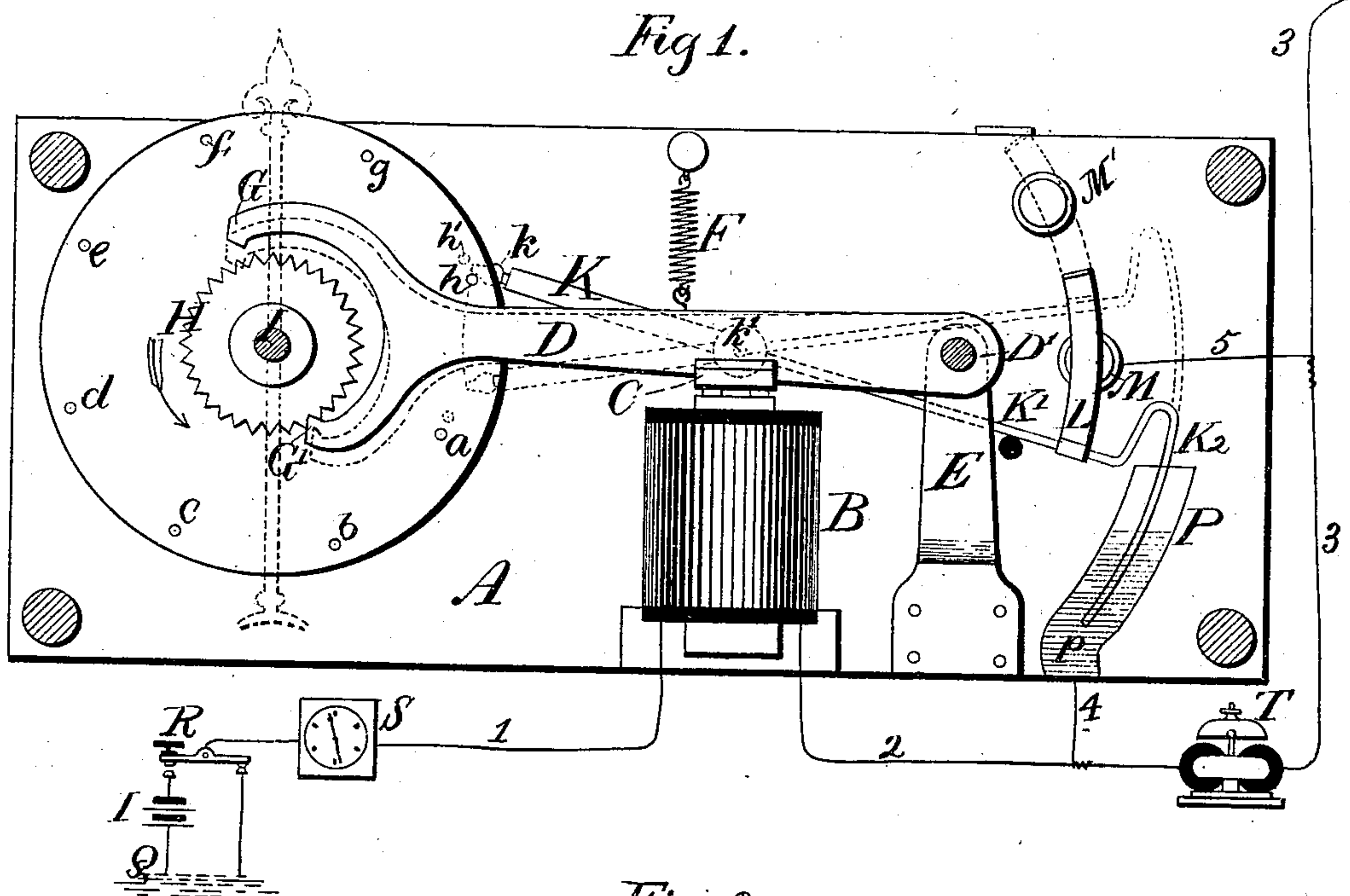
(No Model.)

H. D. SISSON.

INDIVIDUAL SIGNALING APPARATUS FOR TELEPHONE LINES.

No. 254,573.

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INDIVIDUAL SIGNALING APPARATUS FOR TELEPHONE-LINES.

SPECIFICATION forming part of Letters Patent No. 254,573, dated March 7, 1882.

Application filed March 28, 1881. (No model.)

To all whom it may concern:

Be it known that I, HENRY D. SISSON, a citizen of the United States, residing at Mill River, in the county of Berkshire and State of Massachusetts, have invented certain new and useful Improvements in Individual Signaling Apparatus for Telephone-Lines, of which the following is a specification.

My invention relates to an improved method of and apparatus for signaling upon telephone or telegraph lines in cases where it is necessary to place a number of stations upon the same line or circuit.

The object of my invention is to enable the operator at the central or principal station of such a line to sound a call or alarm at any particular station required without putting in operation any of the other alarms upon the line, and I effect this result by simply breaking and closing the circuit of the line upon which the several stations are situated by means of a key or circuit-breaker at the central station.

To this end my invention consists in certain novel combinations of mechanism at each sub-station, whereby, through the agency of successive electrical impulses transmitted over the line, the operator at the principal station is enabled to sound the alarm at any particular sub-station upon the line, as desired, without producing any effect upon the alarms of the remaining stations.

The particular subject-matter claimed as new will be specifically designated in the several claims at the end of this specification.

In the accompanying drawings, Figure 1 is a vertical section of an apparatus embodying my invention, which is designed to be placed at each station along the line. Fig. 2 represents the same apparatus with the parts in a different position. The circuit-connections are shown in diagram in connection with Fig. 1.

Referring to the figures, A represents the frame upon which the several parts of the mechanism are mounted.

B is an ordinary electro-magnet of soft iron, surrounded by coils of insulated wire, and C is its armature, secured in the usual manner to a horizontal lever, D, which is pivoted at D' to a supporting-bracket, E. The lever D is provided with the usual retractile spring, F.

The free end of the armature-lever D is shaped into a fork, carrying at its extremities two pallets, G and G', which alternately engage with the teeth at opposite points of the periphery of a star-wheel, H, which is mounted upon an arbor, I. This organization is well known, being frequently used in type-printing telegraphs, and is termed a "propelling-escapement." Upon the same axis I is fixed a disk, J, which rotates with it. The disk J carries a series of pins, *a b c d e f g h*, the number of which pins correspond to the number of stations which are designed to be operated in the same circuit. I have shown eight such pins in the drawings. By referring to the figures it will be seen that all the pins in the series, with the exception of the pin *a*, are placed at an equal distance from the axis, and they consequently follow each other in the same path when the disk is rotated. The object of the peculiar arrangement of the pin *a* will be hereinafter explained.

K is a light horizontal metallic lever, which moves freely upon a pivot, *k'*. Its free extremity *k* is of a tapering form, as shown in the figures, and when swung upon its axis in a vertical plane the path of the tapering extremity *k* intersects the path of the series of pins upon the disk J. The lever K is also provided with a projecting arm, K', to which is attached a thin metallic spring, L, which constitutes a circuit-closer, as hereinafter explained. The arm K' and its attachments are somewhat lighter than the lever K, which latter therefore has a tendency to overbalance the former and to drop down.

M is an insulated metallic stud, which is inserted in the frame A of the apparatus in such a position that the spring L presses against it with slight friction as it passes over it, thus forming an electrical connection with it. The extremity of the arm K' is bent into a curved form, as shown at K², and is made to dip into a hollow receptacle, P, containing a quantity of metallic mercury, *p*.

The apparatus which has been described is provided for each sub-station upon the line, the only difference between them being in the position of the pins upon the disk J, the arrangement of which will be hereinafter explained.

The circuit-connections are as follows: The ap-

paratus at the central or principal station is represented in diagram form in Fig. 1, and consists of a battery, I, one pole of which is connected with the earth at Q, a key or other circuit-closer, R, and an indicator, S, which latter may consist merely of an electro-magnet placed in the main-line circuit, which actuates an armature and propelling-escapement similar to and having the same number of teeth as that shown in the figures, but carrying a dial-hand upon its axis instead of a disk. The circuit continues from the indicator S by the wire 1 to the electro-magnet B of the apparatus shown in the figures, which is supposed to be situated at the first station in the series, and which, for convenience, may be designated as station A. From thence the circuit continues by the wire 2 to the electro magnet of an alarm-bell, T, of the usual or any metallic construction, and from thence by the wire 3 to station B, the next in the series, and so on to the end of the line, where it terminates in the earth in the usual manner. A branch wire, 4, is connected with the metallic mercury *p* in the receptacle P, and is joined to the wire 2 at a point between the electro-magnet B and the alarm-bell T. A wire, 5, also connects the insulated metallic stud M with the wire 3. It will therefore be obvious that whenever a connection is formed between the wire 4 and the wire 5 the alarm-bell T will be shunted, and will consequently be inoperative by means of any current traversing the main line.

It has already been stated that the pin *a* in the apparatus shown in the figures is not in the same circumferential line with the remainder of the pins in the periphery of the disk, being placed somewhat nearer the axis or within the line of the others. At station B the pin *b* is thus set within the line, at station C the pin *c*, and so on; and it is by means of this arrangement of the respective pins that I am enabled to bring into operation the alarm at any particular station at pleasure.

In the apparatus shown in the drawings the star-wheel H has thirty-two teeth, and the escapement is so constructed that the star-wheel will advance a distance of half a tooth during the downward motion of the armature-lever and half a tooth during the return motion. Consequently the wheel advances a distance equal to one tooth each time the main circuit is closed and broken, and four successive electrical pulsations are necessary in order to advance the disk J a distance equal to the distance between two of the pins upon its periphery.

The operation of the apparatus is as follows: When in its normal position, as shown in Fig. 1, the tapering extremity *k* of the lever K at station A rests upon the pin *h* on the disk J. Consequently this end of the lever is elevated, while the arm *K'* at the opposite end is depressed, so that its extremity *K²* dips into the mercury *p*. At the same time the spring L presses lightly against the stud M, whereby connection is formed through the spring and the extremity of the arm *K²* from the wire 4 to

the wire 5, thus shunting the alarm-bell T. If, now, it is desired to sound the alarm-bell at station A from the central station, a single electric pulsation is transmitted over the line by closing the key once, which advances the star-wheel I a distance of one tooth and causes the pin *h* to be advanced to the position indicated by the dotted circle *h'* in Fig. 1. This movement releases the free end *k* of the lever K, which falls by its own gravity into the position shown by the dotted lines in Fig. 1, thus lifting the arm *K²* from the mercury *p* and interrupting the connection between the wires 4 and 5, and permitting the main circuit to pass through the alarm-bell T. After pausing long enough to permit the lever K to fall into the position described, the operator at the central station transmits a sufficient number of additional pulsations to carry the apparatus through a complete revolution and bring it to its normal position. In case now under consideration thirty-one pulsations will be required to effect this. As the disk J rotates in the direction of the arrow the pin *a*, being set within the line of the other pins, passes by the end of the lever K without touching it; but the succeeding pin *b* will come in contact with the end of the lever at the fifth pulsation and carry it up, restoring it to its normal position and cutting out the alarm-bell from the circuit. This operation will be best understood by referring to Fig. 2, in which the several positions of the lever when acted upon by the successive pins are shown in dotted lines. After each successive pin of the series passes beyond the end of the lever into the position shown by the dotted circle *h'*, Fig. 1, the lever will drop down, as usual, but will be intercepted by the next pin of the series, and consequently cannot fall far enough to lift the arm at its opposite extremity from the mercury unless a pause is made in the transmission of the pulsations immediately after the passage of the pin *h*.

In case the apparatus is in its normal position, as shown in Fig. 1, and it is desired to signal some other station upon the line—as, for example, station B—without sounding an alarm at station A, the sending operator transmits a series of five pulsations in rapid succession. The first of these pulsations releases the end of the lever K, while the second pulsation brings the pin *a* into the position in which it is represented in Fig. 2 before the end of the lever K reaches that point in its descent. Consequently the latter will be lifted by the pin *a*, and will not be permitted to descend far enough to lift the arm *K²* at its opposite extremity from the mercury *p*. Hence the shunt-circuit around the alarm-bell will remain unbroken.

By means of the indicator S, the hand or pointer of which moves in unison with the apparatus at all the stations, the operator is enabled at all times to know the exact position of the said apparatus. Thus it will be understood that by making a pause after the transmission of the proper number of pulsations the

shunt-circuit passing around the alarm-bell may be interrupted at any station required, after which the four following pulsations transmitted will traverse the electro-magnet of the alarm-bell at that station and cause the same to be sounded.

A mechanical circuit-breaker of suitable character may be employed instead of the hand-key at the central station.

10 The hereinbefore-described arrangement of circuits for operating the apparatus may be modified by extending the main wire from the electro-magnet B to a connection with the axis k' of the lever K' and by connecting the main
15 line extending to the next station of the series with the metallic mercury p in the receptacle P, the alarm-bell T being included in a branch extending from this last-mentioned line to the insulated stud M' . This alternative arrange-
20 ment of circuits is indicated by dotted lines in Fig. 2. The alarm-bell is in a normally-open branch or loop of the main line; but the mechanical operation of the apparatus remains unchanged.

25 Instead of the rubbing contact of the spring L against the stud M, a movable and stationary contact-point may be employed similar to that of a Morse relay.

By placing an index or dial hand on the axis
30 I on the escapement at each station, as shown in dotted lines in Fig. 1, any station on the line may be enabled to signal directly to any other station by the aid of a suitable key or circuit-breaker, thereby rendering it unnecessary
35 to signal the central station, except when a communication with some other circuit was required to be established.

I do not claim the combination of a signaling device actuated by a battery, both of which
40 are contained in a local circuit, and mechan-

ism for controlling that circuit actuated by an independent mechanical force applied at each station.

I claim as my invention—

1. The combination, substantially as herein- 45 before set forth, of the alarm-bell placed in the loop of the main line, the electro-magnet, its armature, the step-by-step escapement actuated thereby, the disk rotated by said escapement, the series of pins thereon, (all concentric save one, this one being placed nearer the center of said disk,) the pivoted circuit-break- 50 ing lever controlled by said pins, and the circuit-closer carried by said lever for shunting said loop, and thus preventing the action of the alarm-bell. 55

2. The individual signaling apparatus for telephone-lines hereinbefore described, consisting of the combination at each station of an electric circuit of the alarm-bell placed in the 60 loop of the main line, an electro-magnet included in the main circuit, its armature, the step-by-step escapement actuated thereby, the disk rotated by said escapement, the series of pins on each disk, (one for each station and all 65 concentric, save the one at each station corresponding to that station, this one being situated nearer the center of said disk than the remaining ones,) the pivoted circuit-breaking lever controlled by said pins, and the circuit- 70 closer carried by said lever for shunting said loop, and thus preventing the action of the alarm-bell.

In testimony whereof I have hereunto subscribed my name this 17th day of February, 75 A. D. 1881.

HENRY D. SISSON.

Witnesses:

AUVEN SMITH,
DYER STUNAND.