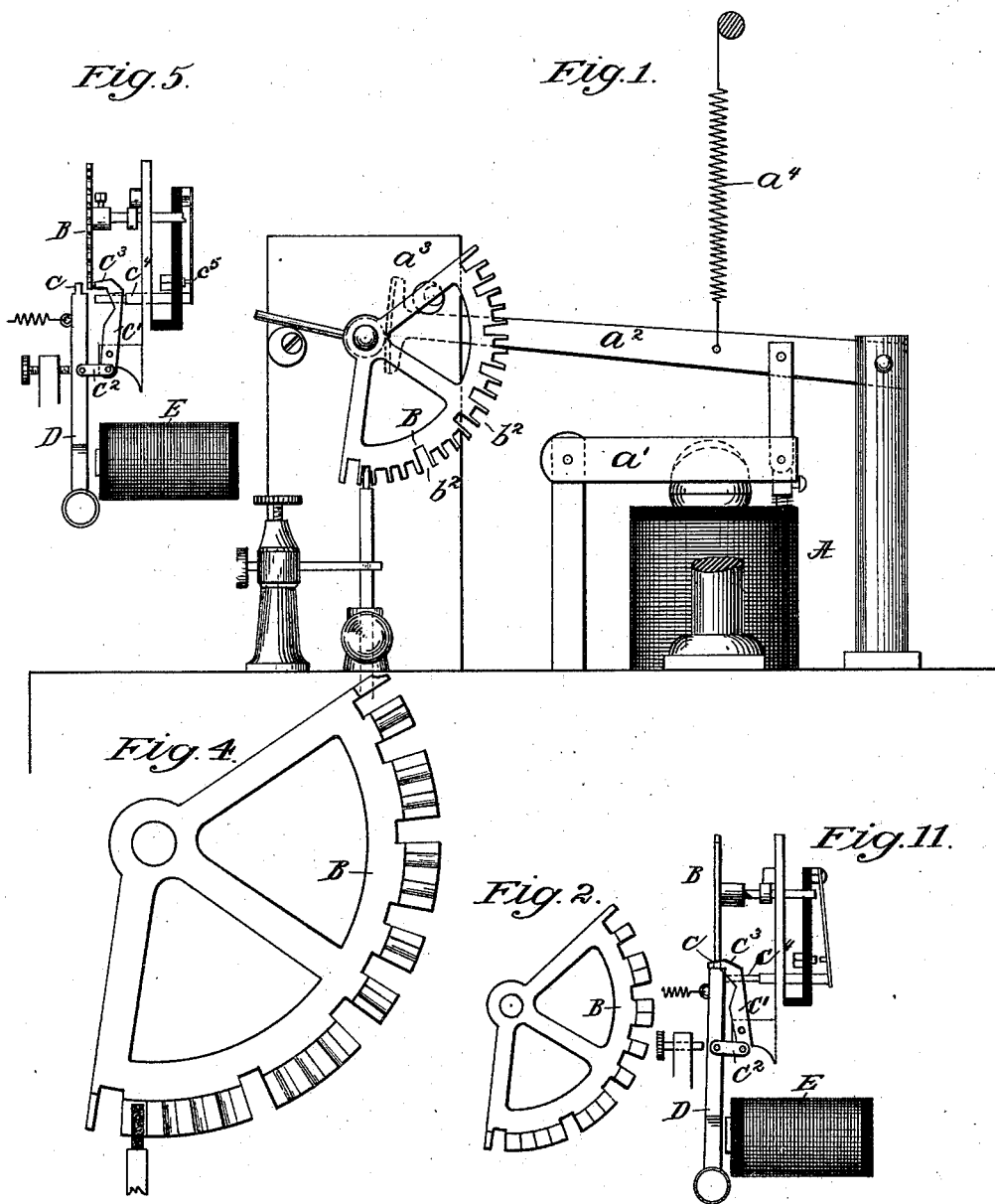


B. PRICE.
ELECTRIC SIGNALING APPARATUS.

No. 545,815.

Patented Sept. 3, 1895.



WITNESSES:
Edward A. Rowland
H. Mac Carthy

Fig. 3.



INVENTOR
Benjamin Price
BY
Price Stewart
ATTORNEYS

(No Model.)

2 Sheets—Sheet 2.

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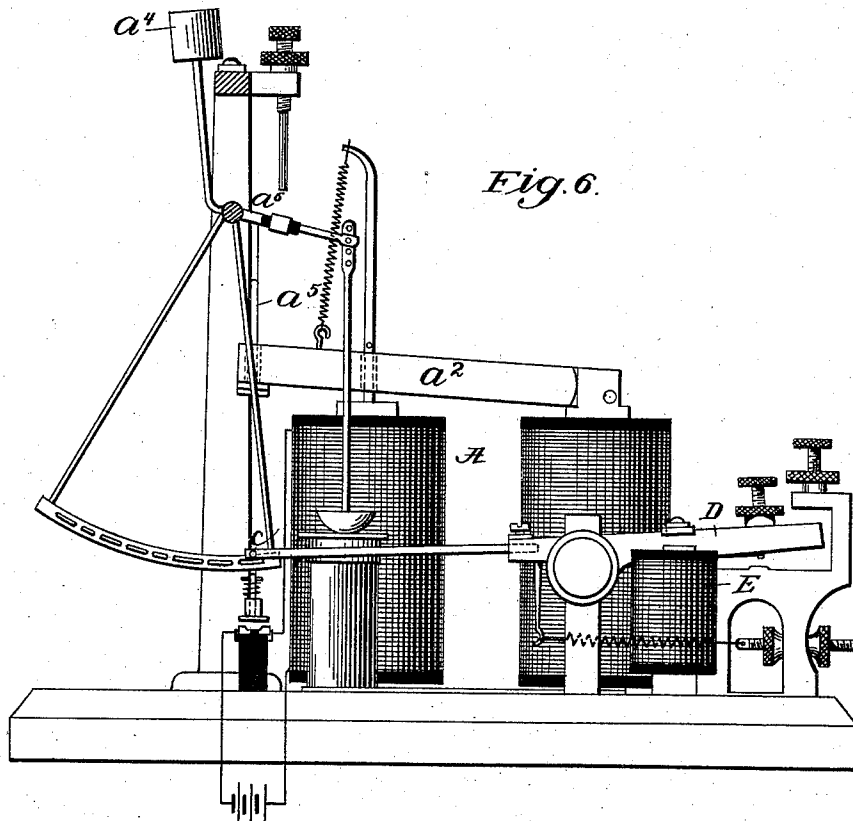


Fig. 6.

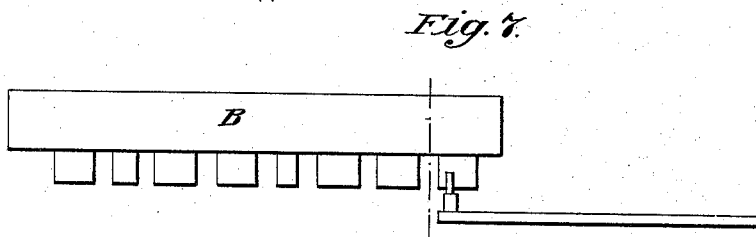
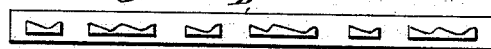


Fig. 7.

Fig. 10.



Fig. 9.



WITNESSES:
Edward C. Rowland
H. MacCarthy

INVENTOR
Benjamin Price
BY
Price Stewart
ATTORNEYS

UNITED STATES PATENT OFFICE.

BENJAMIN PRICE, OF BALTIMORE, MARYLAND, ASSIGNOR TO THE ELECTRIC
SELECTOR AND SIGNAL COMPANY, OF WEST VIRGINIA.

ELECTRIC SIGNALING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 545,815, dated September 3, 1895.

Application filed April 24, 1894. Serial No. 508,807. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN PRICE, of the city of Baltimore, in the State of Maryland, have invented certain new and useful
5 Improvements in Electric Signaling Apparatuses, whereby these devices are simplified in form and structure and rendered more certain in their operation in responding to the transmitted impulses, of which the following
10 is a specification.

The accompanying drawings illustrate the invention, of which—

Figure 1 is a view of a wheel or sector having a forward progressive movement and provided with open keys or key-bars and showing
15 a single finger for working out the combination; Fig. 2, a view of a wheel or sector with solid key-bars; Fig. 3, a view of finger adapted to arrest the movement of sector by
20 fractional pressure; Fig. 4, an enlarged side view of wheel or sector with keys provided with an inclined plane to co-operate with finger and automatically adjust the sector to a
25 fixed starting and stopping place with each impulse. Fig. 5 is a side view of sector operated by double fingers entering the keys of sector from opposite sides. This figure shows the fingers open and the sector released.
30 Fig. 6 is a view of another form of sector with single finger for working out the combination and means for restoring the sector to starting-point when the finger passes between the keys; Fig. 7, a view of sector spread out
35 and finger resting upon one of the keys; Fig. 8, a view of sector with keys and vibrating finger to enter the keys and space certain of the impulses; Fig. 9, a view of a sector spread out and provided with keys having inclined
40 planes thereon to co-operate with the finger and adjust itself to a fixed stopping and starting place; Fig. 10, a section of sector, showing a key with a finger resting thereon; Fig. 11, the same as Fig. 5, with the fingers closed and the sector stopped.

45 In Letters Patent of the United States granted to Adin A. Hatch, No. 403,104, there is shown and described a signaling apparatus having a wheel or sector, to which is imparted a normal forward movement, which starts
50 upon this movement whenever this sector is released and is stopped by the armature-lever

in its movements and released again to pursue its course. Upon this wheel or sector is cut, stamped, or otherwise secured a series of keys or key-bars intended to designate dots
55 and dashes or dots and spaces of electrical impulses, and the keys represent a fixed or selected combination which responds to these impulses sent out by a transmitting-instrument, which may be an ordinary telegraph-
60 key or an automatic transmitting-instrument. Upon such a wheel or sector there are also intervals between the key-bars to allow one of the operating-fingers to pass through and in its passage impart movement to mechanism for restoring the sector to its starting
65 point. Upon this Hatch instrument, which is selected only as a representative of a class of instruments, the keys or key-bars are shown in the form of staples inclosing a definite
70 space, and the side lines or walls of this inclosed space intercept the finger or fingers operated by the armature-lever to stop the progressive forward movement of the sector by
75 contacting with a hook or bent portion of the finger or by contacting with a vibrating finger which enters the inclosed space and is impelled by and moves with the sector a given distance until it comes to a full stop. When
80 one of these fingers passes through one of the spaces between the keys, it imparts movement to mechanism for restoring the sector to its starting-point.

The drawings also show—as, for example, in Fig. 1, 2, 4, 5, and 11—a wheel having notches
85 of different depths cut in its periphery and operating and coacting with two fingers which enter the open spaces from opposite sides and arrest the progressive movement of the wheel by contacting with the side walls of the
90 inclosing spaces. These figures also show notches of greater depth than the others, through which one of the fingers is allowed to pass when a wrong combination is sent, and, as in the case of Hatch, it imparts move-
95 ment to mechanism to restore the sector to its starting-point.

Viewing Figs. 1, 5, and 11 of the drawings, A is an electromagnet suitably mounted and imparts movement to its armature a' by the
100 closing of the circuit through its coils. The armature acting upon a lever, as a^2 , attracts

this lever. On its end is a toothed rack a^3 , which meshes with a pinion attached to the sector.

B is a wheel or sector to which a forward progressive movement is given by the lever a^2 and rack a^3 . Upon the periphery of this sector (viewing Fig. 1) is cut a series of notches, some of which are deeper than the others. When the combination is worked out, the finger hereinafter described rests upon the bases of the shallow notches, and should it fail the finger passes through one of the deeper notches and actuates a shunt by which the current is cut off from the coils of the magnet A, when the sector is retracted and thrown to its starting-point by the spring a^4 . This device is usually worked with two fingers, as shown in Figs. 5 and 11, and marked C and c' . The finger C is an extension of the armature-lever D, and c' is in the form of a pivoted lever, having its short arm connected with the armature-lever D by a link, as c^2 . The armature-lever D is operated by impulses transmitted through the coils of the magnet E, and in response to said impulses the fingers enter the notches and hold the sector until released. The upper end of the lever c' is provided with a blade, as c^3 , which passes in and out of the notches, alternately holding and releasing the sector in response to the impulses, and the projection C on the end of the armature-lever D will only pass through the deep notches of the sector, and in passing strikes a bar, as c^4 , which operates mechanism to open the circuit around the magnet A and allow the sector to be returned to its starting-point. Such an instrument may be said to be operated upon a closed circuit as the magnet A through its levers is imparting a progressive movement to the sector when its circuit is closed and the sector is thrown back when the circuit is open.

The drawings also illustrate an apparatus operated upon open circuit, as shown in Fig. 6. In such case the forward movement to the sector is imparted by a spring or weight, as shown at a^4 of Fig. 6. The magnet E operates its armature-lever D through the impulses received from the transmitting-instrument, which, like the case above described, is provided on its end with a finger or projection c , which is bent on its end and enters within key-bars and stops the sector by contact with the sides of the keys. When this finger passes through the open spaces between the keys, it strikes upon the rod c^4 , closes the circuit, as at c^5 , through the magnet A, which attracts its armature-lever a^2 , operating upon the link a^5 , which in turn is attached to a projection a^6 on the sector-shaft and returns the sector to its starting-point.

In both cases the device operates with open key-bars and depends upon the sides of the openings to co-operate with the fingers in stopping the sector or wheel.

In the devices shown and described the working of the instrument is sometimes un-

satisfactory. For example, an instrument which works perfectly for some time will occasionally fail—that is to say, when a selected combination is transmitted to the instrument to which that particular combination is adapted the finger will sometimes fall through one of the intermediate spaces and return the wheel or sector to its starting-point before the combination is entirely worked out. When an automatic transmitting-instrument is used, this does not occur as often as when the combination is transmitted by an operator using the ordinary Morse key. The causes for this may perhaps reside in the fact that the operator may not gage his spaces in exact conformity with the travel of the wheel or sector, or else the transmitting-instrument may not move in exact time with the sector, or the contacts and spaces of the transmitting-instrument may not conform in length with those on the sector. In either event the finger may touch upon the key-bar, and should this bar be rough or uneven on its surface it would hold the sector without sliding upon the key-lever until its hook or shoulder caught against the side wall of the key. At the next impulse the distance from its proper position would be increased and at the next would miss the key and drop through the space, or the finger might slide only a part of the way on the key-bar and thus lose its proper relative position.

One object of my invention is to dispense with the necessity of the side walls and arrange the device so that it may be stopped simply by frictional pressure upon the key, and thus enable me to perform the work with a solid key-bar as well as an open one.

Another object of the invention is to dispense with one of the fingers and work out the combination without the aid of the second finger, and another object is to so arrange or construct the instrument to co-operate with the finger that a positive starting and stopping point may be obtained automatically, giving a fixed and determined distance of travel to the sector or wheel with each impulse.

My invention will apply to any of the forms of sector or wheel.

In Fig. 3 there is shown a finger which is roughened upon its end or may be provided with a frictional pad of india-rubber or other material, which, when in contact with the key, would hold it where it touched, or both the finger and key-bar may be provided with a pad or otherwise roughened. Now, in cases where the movements of the sector or wheel and the transmitting-instrument are synchronous or in exact time with each other, or approximately exact, and the structure of the contacts and intermediate spaces of the transmitting-instrument conforms to the structure of the key-bars on the wheel or sector, such an arrangement to prevent slipping of the finger when in contact with the keys would work the combination through to

the end and without the use of the second finger. So, also, an expert operator may work the combination through with an ordinary telegraph-key used as a transmitting-instrument, thus using a single finger and solid key-bar, if desired.

Figs. 2, 6, 7, and 10 show a sector with solid key-bars and single finger for working the combination.

Figs. 4 and 9 show different views of a sector, having its keys constructed to co-operate with a finger, so as to arrest the progressive movement of the wheel or sector at a fixed point. The spaces between the key-bars being equal, or nearly so, the single key-bars being constructed of approximately equal length and the double ones the length of two single ones, it is evident that a sector having a steady progressive movement will pass through the distance between the keys in a given time. Now, upon viewing the figures it will be seen that each of the keys is provided with an inclined plane, as *x*, so that if the finger should touch upon any part of the inclined plane (the sector moving in the direction of the arrow) its movement would be arrested when the finger was at the bottom of the plane, and as these distances are approximately exact the sector would be arrested at a fixed point and the finger would have for its next stopping-place a fixed and determinate distance, which, by its co-operation with the key-bar, automatically operates to produce a fixed stopping and starting point with each movement of the sector forward. As shown in Fig. 9, the key-bar may be con-

structed with two inclined planes, so that should the finger pass over one and strike the other it would be brought back to the apex of the angle. In general, however, one of the inclined planes would be sufficient.

What I claim, and desire to secure by Letters Patent, is—

1. In an electric signaling apparatus a wheel or sector having a normal progressive forward movement, and provided with a mechanical arrangement of solid keys representing a fixed combination of electrical impulses, in combination with the armature lever of an electro magnet, arranged to arrest and release the sector, and having a single finger provided with a roughened device to co-operate with the solid key-bars, and thereby arrest its movement by frictional pressure.

2. In an electric signaling apparatus, a wheel or sector, having a normal forward progressive movement, and provided with a mechanical arrangement of solid keys, formed in the shape of an inclined plane with a shoulder at the end of the plane, in combination with the armature lever of an electro magnet provided with a single finger to co-operate with the inclined plane and shoulder of the key-bars and thereby secure a fixed starting and stopping place with each movement of the finger.

Signed at Baltimore city, in the State of Maryland, this 23d day of April, A. D. 1894.

BENJAMIN PRICE.

Witnesses:

J. W. WIDDEMAUF,
H. MACCARTHY.