

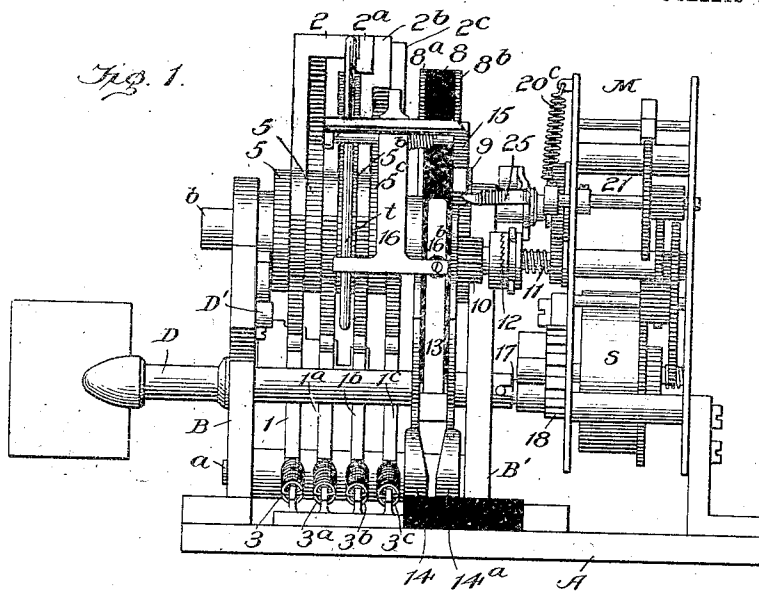
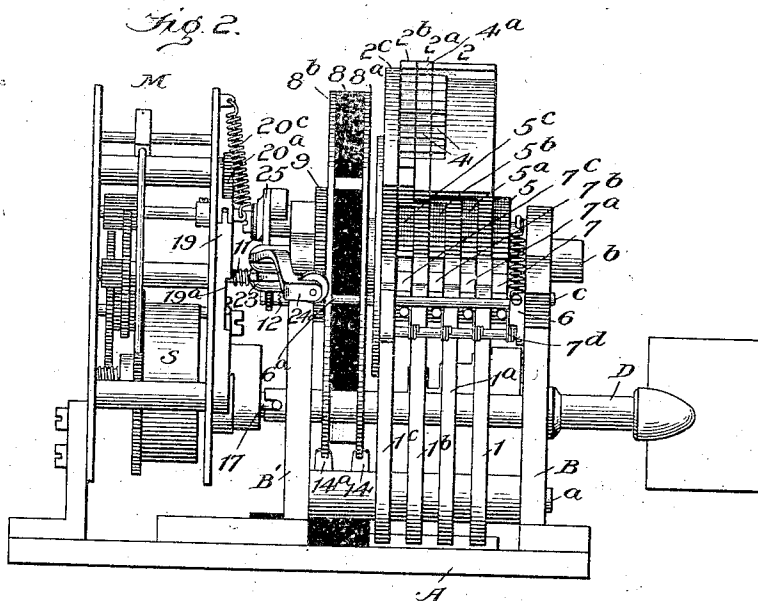
No. 883,829.

PATENTED APR. 7, 1908.

J. REUTER.
AUTOMATIC SIGNALING MECHANISM.

APPLICATION FILED APR. 15, 1907.

3 SHEETS—SHEET 1.



Inventor

Witnesses
Edwin L. Bradford
J. P. Reuter

By

Josef Reuter
J. M. Ritter Jr.

Attorney

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3 SHEETS—SHEET 2.

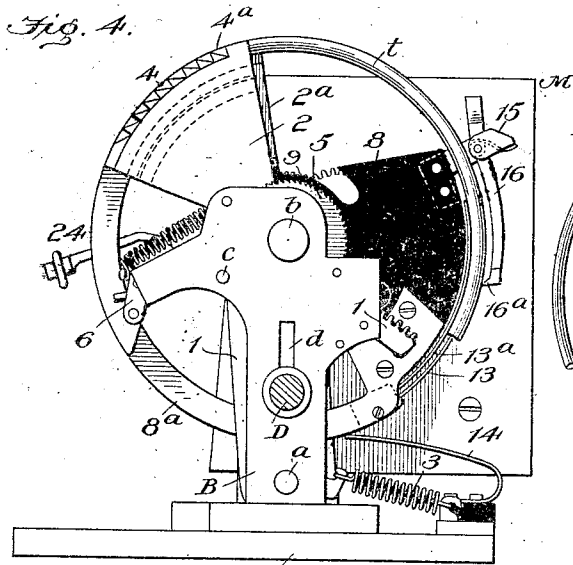
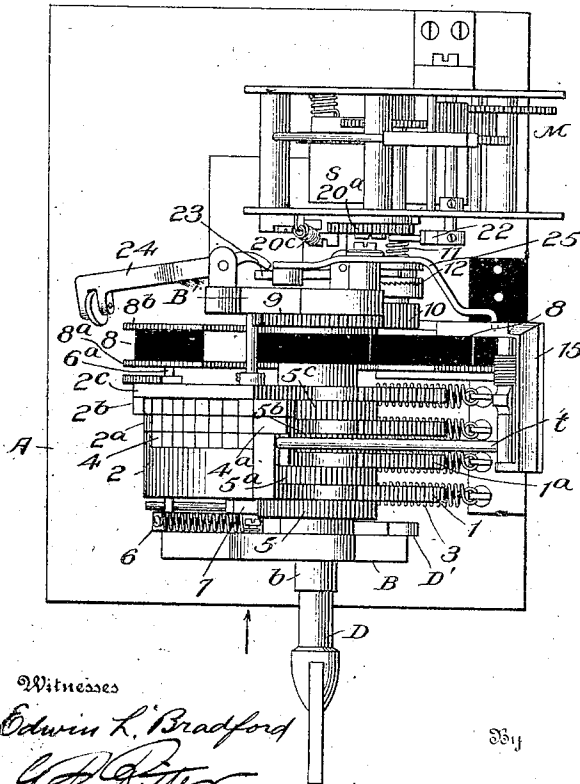


Fig. 3.



Witnesses
Edwin L. Bradford
J. Reuter

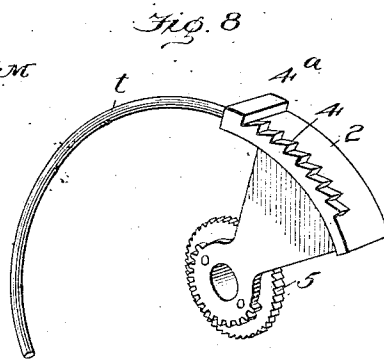
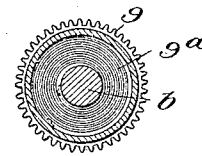
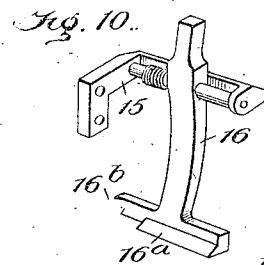
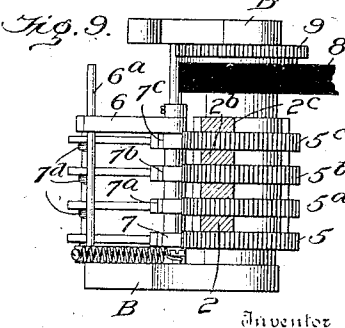


Fig. 11.



J. Reuter
F. N. Rutter, Jr.

Attorney

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3 SHEETS—SHEET 3.

Fig. 5.

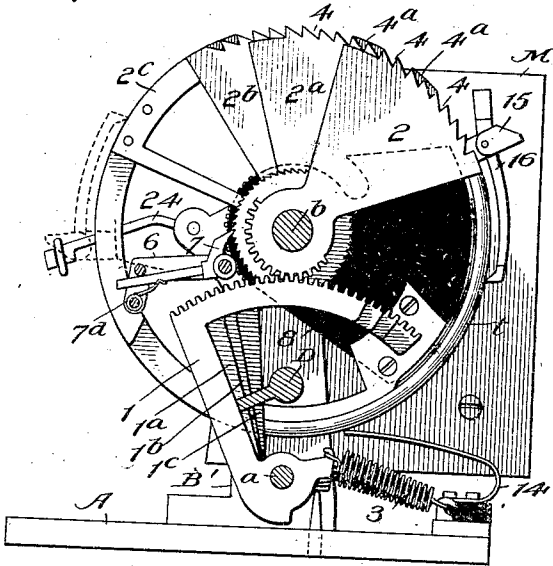


Fig. 7.

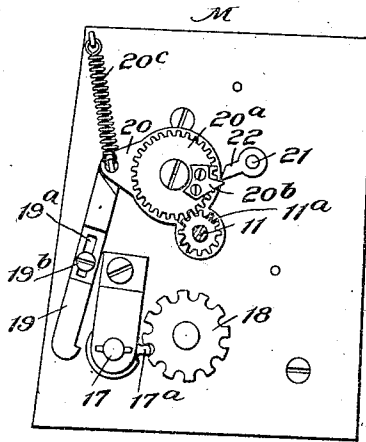


Fig. 12.

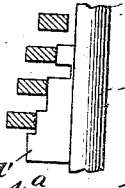


Fig. 13.

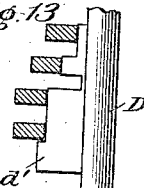


Fig. 14.

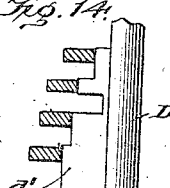


Fig. 6.

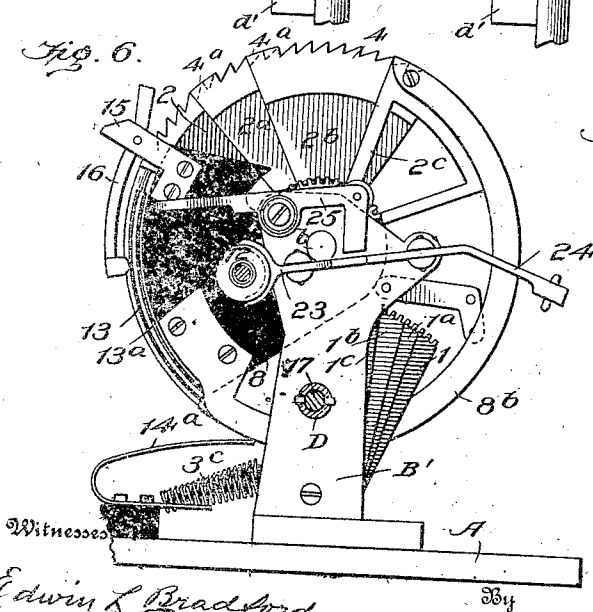


Fig. 15.

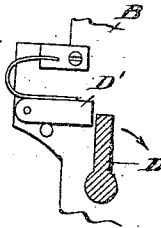
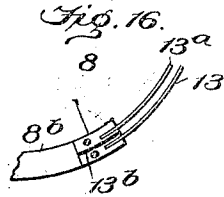


Fig. 16.



Witnessed

Edwin L. Bradford
J. P. Reuter

By

Josef Reuter.
F. W. Reuter, Jr.
Attorney

UNITED STATES PATENT OFFICE.

JOSEF REUTER, OF ROCHESTER, NEW YORK.

AUTOMATIC SIGNALING MECHANISM.

No. 883,829.

Specification of Letters Patent.

Patented April 7, 1908.

Application filed April 15, 1907. Serial No. 368,369.

To all whom it may concern:

Be it known that I, JOSEF REUTER, a citizen of the German Empire, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Automatic Signaling Mechanism; 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 invention relates to the construction of automatic signaling mechanism for the telegraphic transmission of signals, such as are required for municipal systems, embracing police, fire-alarm, and the like signals of a distinct and varying character, and while the apparatus as a whole will, or may, comprise a motor, a transmitting mechanism and a recorder, the last two in circuit, the particular character of the motor and recorder, as such, form no part of the present invention, and may be of any well known or desired character. Furthermore, though some means of automatically transmitting the box or station number from which the variable signal is sent will or may be required, said number being unchangeable may be provided for by any of several well known devices operated by a motor and intended to send a fixed signal.

The primary object of the present invention is the production of a simple and efficient mechanism which may be automatically set to transmit any one of a plurality of definite signals, and to this end my invention embraces the combination of a plurality of toothed or serrated members, preferably segments, each provided with space or guard sections, said members relatively adjustable to produce a series of depressions or projections interrupted at varying intervals, and a contact maker controlled by said toothed members, or segments, said toothed members and said contact member being relatively movable.

A secondary feature of my invention resides in the provision of means for automatically connecting and disconnecting the motor with the transmitting mechanism and releasing and restoring to normal position the toothed or serrated members as soon as their transmitting function is performed.

There are other features of invention, embracing particular combinations, and special features of elemental construction, all as will hereinafter more fully appear.

In the drawings chosen for the purpose of illustrating my invention, the scope whereof is pointed out in the claims, Figure 1 is side elevation of a signaling mechanism embodying my invention. Fig. 2 is a similar view showing the reverse side from that shown in Fig. 1. Fig. 3 is a top or plan view of the signaling mechanism shown in Figs. 1 and 2. Fig. 4 is an end view of the signaling mechanism looking in the direction of the arrow Fig. 3, the serrated members or segments being in the closed or normal position. Fig. 5 is a view of the same end of the mechanism as shown in Fig. 4, portion of the frame broken away, and the serrated members expanded or adjusted to give the signal 4—2—7. Fig. 6 is a view of the reverse end of the mechanism from that shown in Fig. 5, the motor frame and clockwork mechanism removed, the serrated members being in the same position as in Fig. 5. Fig. 7 is a view of those portions of the motor or clockwork mechanism which directly connect with the transmitting mechanism. Fig. 8 is a detached view of one of the serrated members or segments which carries a track or guide rail for the contact maker. Fig. 9 is a detached view of the click frame, clicks and click wheels which control the toothed members or segments, the segments or serrated members being in cross section. Fig. 10 is a detached view of the contact maker and its bracket. Fig. 11 is a sectional view of the barrel attached to the pinion of the insulator block which latter carries the contact springs and the contact maker, showing the coiled spring within the barrel by which the parts first noted are returned to their normal positions when released from the motor. Figs. 12, 13, and 14 are views of portions of keys showing different arrangements of the leaves or projections to effect different arrangements or combinations of the serrated members or segments of the apparatus for transmitting different signals. Fig. 15 is a detached view of the stop for preventing the turning of the key in the wrong direction. Fig. 16 is a detail view of the end of the rails 8^a, 8^b and the contact springs 13, 13^a, show-

ing the connection of the contact springs with the rails, and the insulator 13^b between the contact springs.

In Figs. 1, 2, 3, 4, 5 and 6 the key, whereby the transmitting mechanism is adjusted or set for transmitting a signal, is shown as remaining in position in the apparatus, but it is of course to be understood that the key D is to be withdrawn after the mechanism has been set and started thereby.

Like symbols refer to like parts wherever they occur.

I will now proceed to describe my invention more fully so that others skilled in the art to which it appertains may apply the same.

In the drawings, A indicates the bed plate of the apparatus and B B' the uprights or posts carrying the arbors *a*, *b*, *c* for the operative elements of the transmitting mechanism, and in the upright B is the key hole *d* for the insertion of the key D wherewith the mechanism is set or adjusted and started.

D' indicates a spring stop on the inner side of post B to prevent the turning of key D in the wrong direction, but said stop will not interfere with the proper revolution of said key.

1, 1^a, 1^b and 1^c indicate a series of racks journaled below on the arbor *a*, so as to turn on said arbor, and toothed above for engagement with a corresponding series of segments 2, 2^a, 2^b, 2^c, said racks being controlled by springs 3, 3^a, 3^b, 3^c which springs tend to draw the racks into the paths of the leaves or projections *d'* on the key D, when not otherwise restrained by the clicks and click wheels as will hereinafter appear.

2, 2^a, 2^b, 2^c indicate a series of segments journaled so as to turn on the arbor *b* above and in line with the arbor *a* of the racks, which segments are toothed below to engage with and be operated by the racks 1, 1^a, 1^b and 1^c and each of said segments except one (2^c) is serrated or has cut in its circumference a series of teeth 4, preferably to produce nine indentations, and has an uncut or raised portion 4^a (or spacer) equal in extent to two or more of the teeth thus formed in the periphery of said segment. The first of said serrated members, or segments 2 carries a circular rod or rail *t* which forms a guide or track for one end of the contact maker in order that no contact may be made when the segments are in their normal or closed position. The last segment, 2^c, is devoid of teeth or indentations, and may be termed a guard or cover member or segment, as its function is to, at times, cover some or all of the teeth of the other segments, to prevent the operation of the contact maker as will hereinafter appear. Attached to each of said segments 2, 2^a, 2^b, 2^c and surrounding the arbor *b* are a series of click wheels 5, 5^a, 5^b, 5^c cut on the

same pitch as and corresponding to the teeth or serrations 4 of the segments. Arranged in a suitable spring supported frame 6 which is journaled on the arbor *c* are a corresponding series of clicks 7, 7^a, 7^b, 7^c one for each segment and its click-wheel. Each of said clicks 7, 7^a, 7^b, 7^c is in turn independently spring supported on the frame 6 as at 7^d so as to have sufficient movement independent of the frame to permit the required movement of the segment in the setting operation of the segments, though by reason of the mounting of the clicks in said click-frame 6, they can be operated in unison to simultaneously release all the segments to allow them to return to their first or normal positions under the operation of the racks 1, 1^a, 1^b, 1^c by springs 3, 3^a, 3^b, 3^c. These clicks and click-wheels have for their object to preserve the relative arrangement of the serrated members or segments when spread and resist the action of the rack springs which tend to restore the segments to their normal or closed position. Projecting laterally from the click frame 6, and into the path of the traveling insulator block 8 which carries the contact make and break lever 16, is an arm 6^a which is at the proper time struck by said insulator block 8 to tilt the click frame 6 and release the serrated members or segments and allow them to return to their normal position.

Journaled on the arbor *b* next adjacent to the last segment 1^c is an insulator block 8 preferably of hard rubber, which insulator is provided with a gear wheel 9 with which engages a small gear wheel 10 loose upon the driving shaft 11 of the motor M and which is adapted to be coupled to said shaft by a spring controlled clutch 12.

The insulator block 8, which is rotated by the motor M as before noted, is provided with two circular metal rails 8^a, 8^b, with which rails are connected the contact springs 13, 13^a having platinum contact points, said contact springs being insulated from each other as at 13^b, and the rails 8^a, 8^b in their travel maintaining contact with the insulated springs 14, 14^a with which the respective terminals of the circuit are connected. The insulator block 8 also carries adjacent to said contact springs 13, 13^a a bracket 15 on which is pivotally mounted a spring pressed lever 16 having a tooth provided with a knife edge 16^a, said tooth being of sufficient width to span all the segments 2, 2^a, 2^b, 2^c so as to enable it to enter the indentations of said segments when this spring pressed lever 16, which constitutes the contact maker, traverses said segments. This contact maker 16 bears on the contact springs 13, 13^a through the intermediacy of a small insulator block 16^b carried by the lever 16 in line with knife edge 16^a.

Any suitable motor M may be utilized for

actuating the transmitting mechanism, but in the present instance an ordinary clock-work mechanism has been selected and coupled with the transmitting mechanism through the intermediacy of spring controlled clutch 12, and gear-wheel 10, on the driving shaft 11 of the motor.

In order to wind the clockwork motor M, and to start the same when the transmission mechanism is set or arranged for a definite signal, a short arbor 17 is provided which carries a tooth or projection 17^a with which arbor 17 the end of key D engages by means of a slot or socket, and which projection 17^a on the revolution of said arbor 17 by the key D, first engages a pinion 18 on the arbor of the motor spring *s* turns the same one tooth and winds said spring to the extent that it will unwind in operating the transmitting mechanism, or contact maker, and said tooth 17^a thereafter engages and trips the pivoted lever 19 which rocks the plate 20 and disengages stop 20^b and arm 22 on arbor 21 of the escapement wheel and this releases the clock work motor and sets the transmitting mechanism in operation. This lever 19 is pivoted to the plate 20 which plate is in turn pivoted on the driving shaft 11 of the motor M, and carries a pinion 20^a which is provided with a stop 20^b, said pinion 20^a gearing with a pinion 11^a on the driving shaft 11, and said stop 20^b arranged to engage an arm 22 on the arbor 21 of the escapement wheel so that the movement of the clock work shall be arrested and the motor stopped at the end of each second revolution of the driving shaft 11.

The trip lever 19 before referred to as pivoted to the plate 20 is slotted as at 19^a and held in proper relation to the arbor 17 and its lug or tooth 17^a by a suitable screw or guide pin 19^b, which passes through such slot and both trip lever 19 and plate 20 are controlled by a spring 20.

23 indicates a shifting lever for the clutch 12, which lever is pivoted on the post or frame B' and is operated by a trip lever 24 also pivoted on the post or frame B' to withdraw the clutch 12 when said lever 24 is struck by the contact maker 16 at the end of its travel or the completion of the sending operation, at which time also, said contact maker being released from the control of the motor by the withdrawal of the clutch 12 is immediately returned to its normal—or first position—by the operation of spring 9^a in the barrel of the pinion 9.

In its return movement and near the close thereof the bracket which carries the contact maker strikes the end of a third lever 25 also pivoted on the post or frame B' which releases the clutch 12 and allows it to again connect the motor M with the transmission mechanism so that the apparatus

will be again in condition for operation as soon as the serrated members have been set or adjusted and the motor wound and started by the insertion and revolution of the key D.

In Figs. 12, 13 and 14 are shown the forms or shapes of the leaves *d'* of several keys D, each key adapted to set the transmitting mechanism for a separate and distinct signal, and it will be noted that the outline of said leaf *d'* controls the relative position of the several racks 1, 1^a, 1^b and 1^c, consequently as each of the segments or members 2, 2^a, 2^b and 2^c operated by said racks, except the final member or segment 2^c, has nine teeth or indentations and a raised covering space equal to two or more teeth, it is possible to have a suitable key to set the transmission mechanism to signal any number or combination of two or three numbers up to 999. If a higher number or a greater combination of numbers is required all that is necessary is to increase the number of racks and segments and the width of the contact maker tooth 16^a.

The construction of the several devices and their combination being substantially such as hereinbefore pointed out, their operation will be as follows: The key D corresponding to a desired signal is inserted in the machine through the keyhole *d* until its end engages the arbor 17 which operates the arbor of the spring of the motor M. The key is then turned to the left hand until its leaf engages the racks 1, 1^a, 1^b, 1^c. The continued turning of the key will simultaneously wind the motor, through the medium of arbor 17, its tooth 17^a and pinion 18 on the arbor of the motor spring *s* and also shift the racks to such relative positions as the outline of the leaf *d'* of the key used shall force them, which movement of the racks being communicated to the segments or members 2, 2^a, 2^b, 2^c spread the same so as to disclose an interrupted series of indentations.

The number of indentations and the location of the interruptions—or spaces—will depend on the leaf of the key used, and will determine the signal set.

As illustrative of the operation of the key D in setting the segments for a signal, note Figs. 12, 13 and 14 of the drawings. If the end margin of the leaf *d'* of key D formed a straight line where it engages the racks 1, 1^a, 1^b, 1^c, then the position of the segments 2, 2^a, 2^b, 2^c as a whole would be changed but not their relation to each other, if, however, the end margin of the leaf *d'* of key D where it engages the racks is irregular then the relative position of the segments will be changed proportionately, or moved out of line, the movement of each rack and the segment operated thereby being more or less than its fellows according to the width of the leaf at said point, and a proportionate number of

serrations or teeth 4 of the respective segments will accordingly be successively exposed or uncovered to coact with the contact maker 16.

5 In the present illustration, in Fig. 4 of the drawing, the serrated members 2, 2^a, 2^b and 2^c are shown in their normal or closed position prior to the movement of the key, and in Figs. 5 and 6 with the segments or serrated
10 members 2, 2^a, 2^b, 2^c as spread by the key. In this instance, reading from right to left in Fig. 5 the transmission mechanism is set for the number 427, the uncut portion 4^a of member 2^a being opposite the fifth and sixth
15 indentations of member 2, and the uncut portion 4^a of member 2^b being opposite the third and fourth indentations of member 2^a, while the guard or cover member 2^c stands opposite the eighth and ninth indentations of
20 member 2^b; when therefore, the contact maker 16, 16^a traverses the periphery of the several segments there will be first four contacts followed by a break or space of the length of two or more teeth, then two contacts fol-
25 lowed by a space, or break, and finally seven contacts, which will telegraph to headquarters 427. The continued movement of the key to the left, after having wound the motor and set the segments or serrated mem-
30 bers 2, 2^a, 2^b, 2^c, finally at the close of the revolution of arbor 17 brings the tooth 17^a thereof in contact with lever 19 drawing the same down and rocking the plate 20 until the stop 20^b on the pinion 20^a releases the arm
35 22 on the arbor 21 of the escapement wheel and starts the motor. The motor being connected with the transmitting mechanism through the clutch 12, gear wheel 10 and arbor 11, as before noted, will immediately
40 set in motion the insulator block 8, which carries the contact maker (lever 16, 16^a) and contact springs (13, 13^a) and said contact maker will traverse the peripheries of the members 2, 2^a, 2^b, 2^c, the knife edge 16^a of
45 the spring pressed lever 16 sinking into each indentation thereof which depression of lever 16 produces a corresponding depression of spring 13 bringing it in contact with 13^a and thus completing or closing the open cir-
50 cuit through said springs, the circular metal circuit rails 8^a, 8^b, and the insulated springs 14, 14^a with which the terminals of the circuit are connected, thus telegraphing the signal to headquarters. When the contact
55 member (lever 16, 16^a) has completed its travel the insulator block 8 which carries the contact maker strikes the arm 6^a of the click frame 6, and depresses the frame 6 so that the clicks 7, 7^a, 7^b, 7^c are simultane-
60 ously withdrawn from the click-wheels 5, 5^a, 5^b, 5^c, which releases the serrated members or segments 2, 2^a, 2^b, 2^c, and permits the springs 3, 3^a, 3^b, 3^c to restore the said members or segments to their normal position, or to
65 alinement, in which position (see Fig. 4) the

cover segment or final segment 2^c covers all the indentations of the operative segments 2, 2^a and 2^b and prevents the operation of the contact maker during its reverse travel. The instant after the insulator block 8 has struck the arm 6^a and withdrawn the clicks from the click-wheels, it strikes the trip lever 24 which in turn operates the lever 23 and withdraws the clutch 12, this disconnects the motor, whereupon the spring 9^a in the barrel of pinion 9 reverses the travel of the insulator block 8 and contact maker and causes them to resume their first or normal position as seen in Figs. 1 and 4 of the drawings. At or near the end of the reverse travel of the insulator block 8 it strikes and operates the lever 25 which releases the clutch 12 and allows it again to couple the motor to the transmission mechanism, whereupon the machine is in condition for operation when a key is again
70 inserted and turned.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable pivoted members, each provided with a plurality of notches adapted to actuate the same contact member, and a contact member, said adjustable members and contact member being relatively movable.

2. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable pivoted members, each provided with a plurality of notches adapted to actuate the same contact member, a contact member, a motor adapted to create a relative movement of the adjustable members and the contact member, and circuit terminals arranged to coact with the contact member.

3. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable pivoted members each provided with a plurality of notches adapted to actuate the same contact member and having a smooth section or space, and a contact member, said adjustable members and the contact member being relatively movable.

4. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable pivoted members, each provided with a plurality of notches adapted to actuate the same contact member, clicks or pawls for the respective adjustable members, and a contact member, said adjustable members and the contact member being relatively movable.

5. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable members, part of which are provided with a plurality of notches adapted to actuate a contact member, and one of which forms a guard or cover for the notched members, and a contact member, said adjustable
125
130

members and the contact member being relatively movable.

6. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable pivoted segments each provided with a plurality of notches adapted to actuate the same contact member, and a contact member, said adjustable segments and the contact member being relatively movable.

7. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable pivoted segments each provided with a plurality of notches adapted to actuate the same contact member, clicks and click-wheels for the respective segments, a traveling contact member, and a motor for causing the contact member to traverse the adjustable segments.

8. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable pivoted segments each provided with a plurality of notches adapted to actuate the same contact member, a plurality of racks for actuating the segments, and a contact member, the adjustable segments and the contact member being relatively movable.

9. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable members each provided with a plurality of notches adapted to actuate a contact member, a contact member, said adjustable members and the contact member being relatively movable, and a yielding click-frame provided with clicks for controlling the adjustable members.

10. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable members each provided with a plurality of notches adapted to actuate a contact member, a yielding click-frame provided with independently yielding clicks for controlling the adjustable members, and a contact member, said adjustable members and the contact member being relatively movable.

11. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable members each provided with a plurality of notches adapted to actuate a contact member, a yielding click-frame, independently yielding clicks mounted on the click frame, and arranged to control the respective adjustable members, a contact member, said contact member and the adjustable member being relatively movable, and a motor for actuating said contact member.

12. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable members, each of which is provided with a plurality of notches for actuating a contact member, a contact member, said adjustable members and the contact member being relatively movable, a yielding click-frame provided with independently

yielding clicks for controlling the adjustable members, a motor for actuating the contact member, a clutch mechanism for coupling the motor with the contact member, and means for tripping the yielding click-frame and shifting the clutch.

13. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable members, each provided with a plurality of notches for actuating a contact member, a contact member, said adjustable members and the contact member being relatively movable, a series of independently yielding clicks for controlling the adjustable members, means for simultaneously withdrawing the clicks and releasing the adjustable members, a motor, a clutch for causing the motor to impart a relative movement to the adjustable members and the contact member, means for moving the clutch out of and into operative position, said means for simultaneously operating the clicks and the means for moving the clutch being arranged to be successively operated.

14. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable members each provided with a plurality of notches adapted to actuate a contact member, a contact member, said adjustable members and said contact member being relatively movable, a motor, a clutch for causing the motor to impart a relative movement to said adjustable members and the contact member, means for starting the motor, said adjustable members and said means for starting the motor being relatively arranged to be operated by a common means.

15. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable pivoted segments, each provided with a plurality of notches adapted to actuate the same contact member, an insulator block having contact springs and a contact-maker mounted thereon, said adjustable segments and said insulator block being relatively movable, and means for imparting a relative movement to said segment and said insulator block.

16. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable segments, each provided with a plurality of notches adapted to actuate a contact member, a series of independently yielding clicks therefor, an insulator block having contact springs and a contact-maker mounted thereon, said adjustable segments and said insulator block being relatively movable, a motor for imparting a relative movement to said segments and said insulator block, and means for simultaneously releasing the segments from the clicks and for restoring the segments to their normal position.

17. In an automatic signaling mechanism,

the combination of a plurality of relatively adjustable segments each provided with notches adapted to actuate a contact member, an insulator block having mounted thereon circuit rails, contact springs and contact maker, said adjustable segments and said insulator block being relatively movable, insulated terminal springs with which the circuit rails maintain contact, and means for causing a relative movement of the adjustable segments and the insulator block.

18. In an automatic signaling mechanism, the combination of a plurality of spring controlled racks, a plurality of relatively adjustable segments each provided with a plurality of notches adapted to actuate a contact member said segments actuated by the racks, a yielding click-frame provided with independently yielding clicks which control the adjustable segments, an insulator block having circuit rails, contact-springs and a contact-maker mounted thereon, said segments and said insulator block being relatively movable, a motor for imparting a relative movement to the adjustable segments and the insulator block, and terminals with which the circuit rails maintain contact.

19. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable segments, each having a plurality of notches adapted to actuate a contact member and also a smooth or unnotched space or section, a cover or guard segment, an insulator block having circuit rails, contact springs and a spring pressed contact lever mounted thereon, the several segments and the insulator block being relatively movable, a motor for imparting a relative movement to the segments and the insulator block, and a spring for reversing the movement when the motor is disconnected.

20. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable segments, each provided with a plurality of notches adapted to actuate a contact member, an insulator block hav-

ing mounted thereon circuit-rails, contact springs and a contact-maker, said adjustable segments and the insulator block being relatively movable, a yielding click-frame provided with independently yielding clicks, a motor for imparting a relative movement to the adjustable segments and the insulator block, a clutch mechanism for connecting the motor with the insulator-block, and a series of levers arranged to be operated by the insulator-block to withdraw the clicks and to put the clutch out of and into operative relation with the insulator-block.

21. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable pivoted members each provided with a plurality of projections and notches of similar length and width adapted to raise and permit the lowering of the same contact member, and a single contact member successively actuated by the teeth and notches of said first named relatively adjustable members.

22. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable pivoted members, part of which have a series of notches adapted to actuate a contact member and part of which have a smooth or unnotched projection or space, a single contact member which is operated by each of said adjustable members, and means for causing a relative movement of said adjustable members and the contact member.

23. In an automatic signaling mechanism, the combination of a plurality of relatively adjustable pivoted members each provided with a plurality of notches adapted to actuate the same contact member, and a contact member adapted to be successively operated by the notches of each of said relatively adjustable members.

In testimony whereof I affix my signature, in presence of two subscribing witnesses. /
JOSEF REUTER.

Witnesses:

FERDINAND TEUTE,
F. JOHN WALTER.