

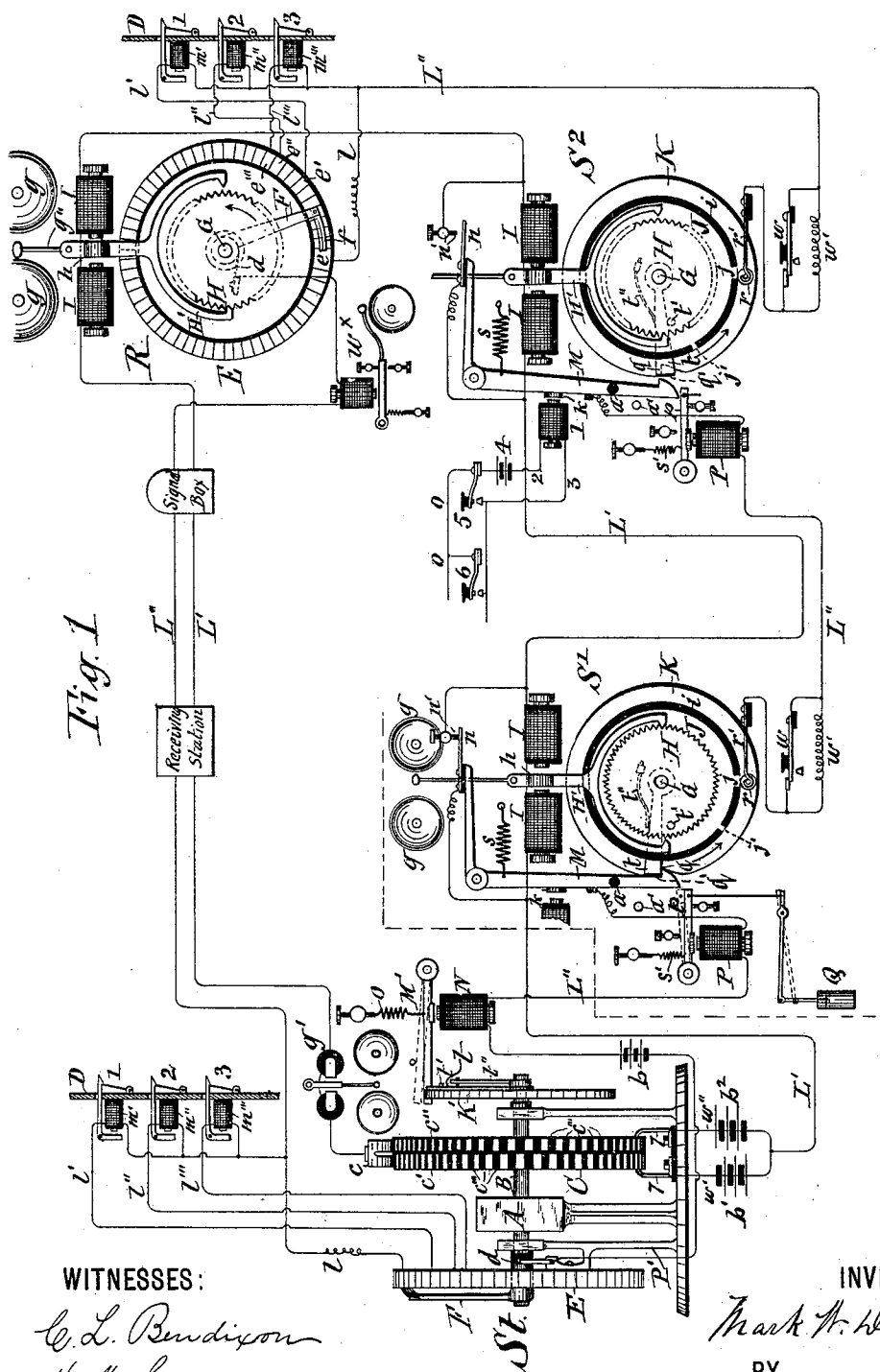
(No Model.)

3 Sheets—Sheet 1.

M. W. DEWEY.
ELECTRIC SIGNALING SYSTEM.

No. 405,831.

Patented June 25, 1889.



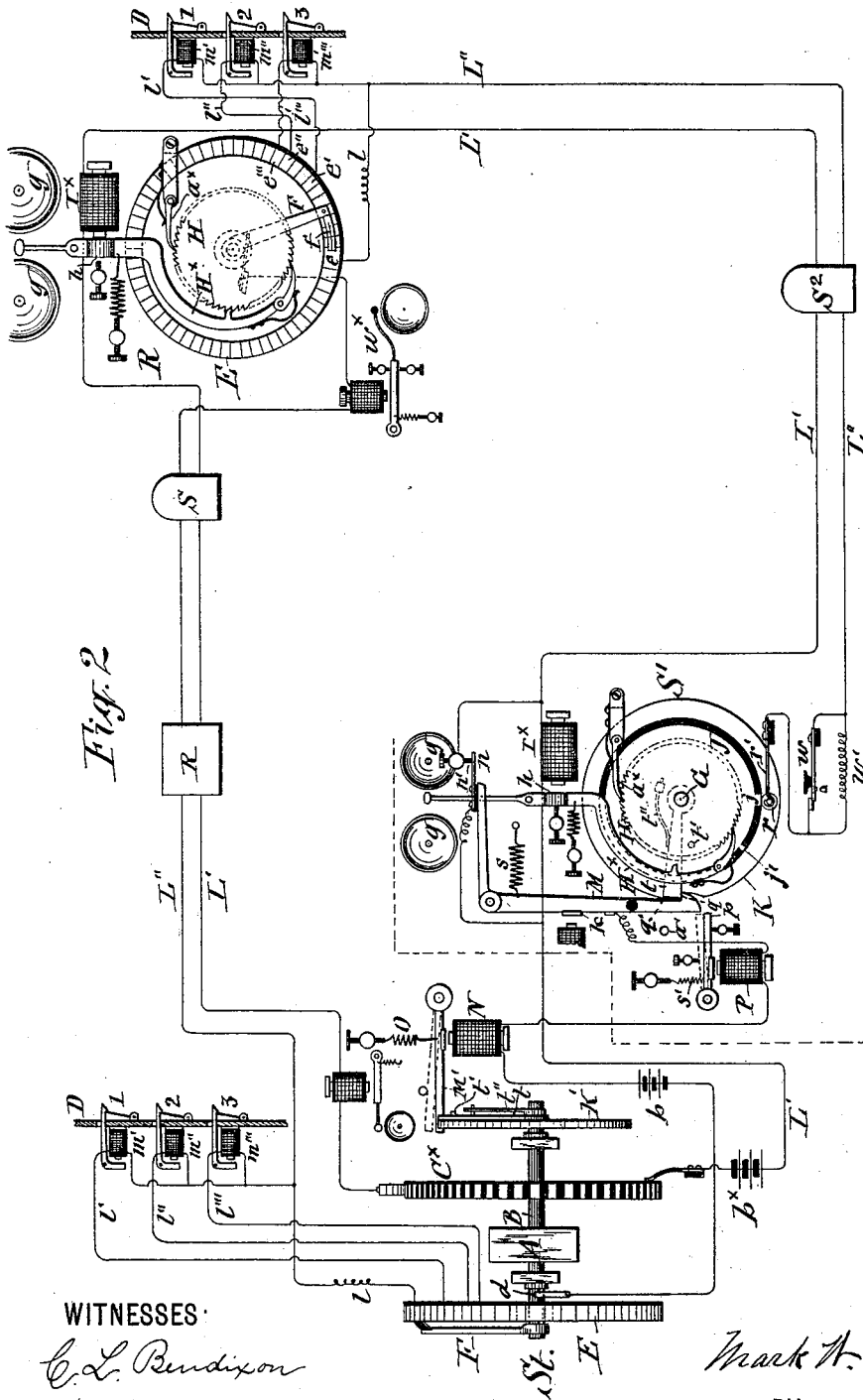
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WITNESSES:

C. L. Bendixon
H. M. Seamanus.

INVENTOR

Mark H. Leroy

BY

Hugh, Lassar & Hull
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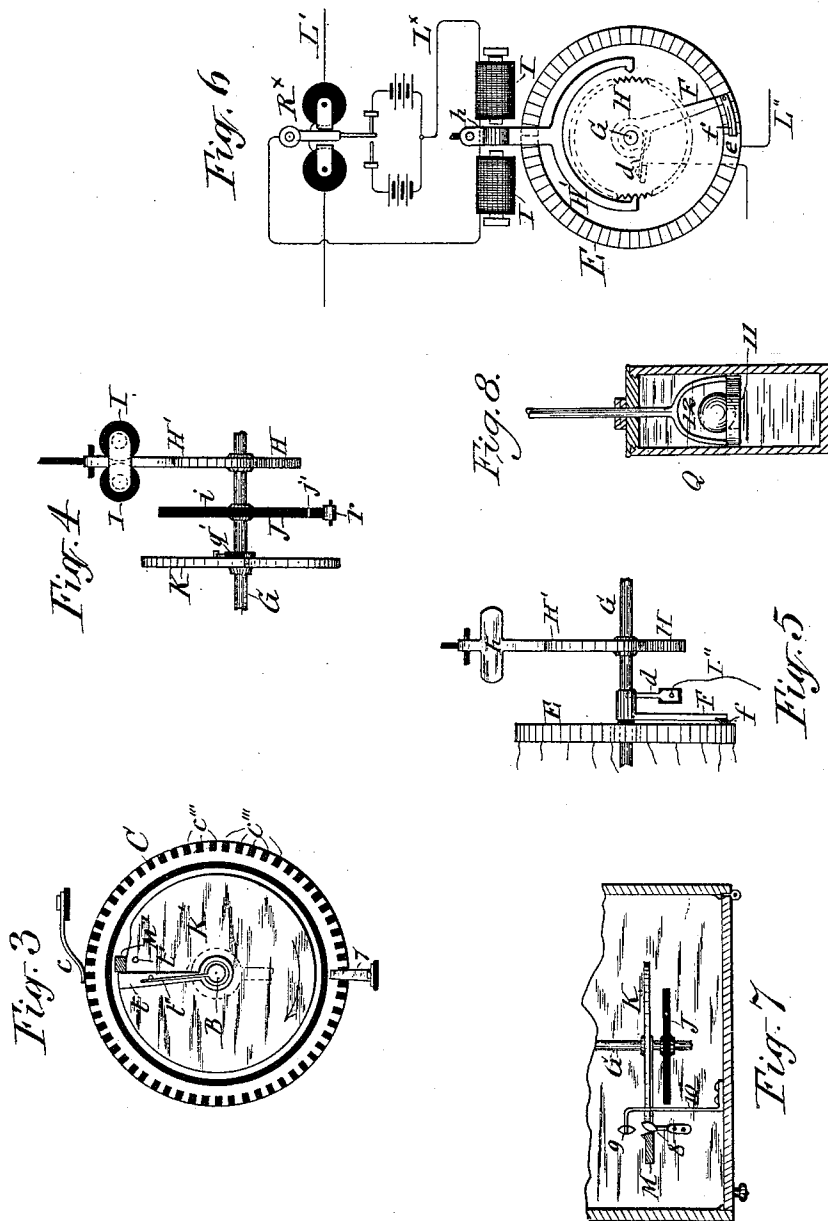
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WITNESSES:

C. L. Bendixson
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UNITED STATES PATENT OFFICE.

MARK W. DEWEY, OF SYRACUSE, NEW YORK, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE DEWEY CORPORATION, OF SAME PLACE.

ELECTRIC SIGNALING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 405,831, dated June 25, 1889.

Application filed March 15, 1889. Serial No. 303,401. (No model.)

To all whom it may concern:

Be it known that I, MARK W. DEWEY, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and
5 useful Improvements in Electric Signaling Systems, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to the class of electric signaling apparatus employing an annunciator or visible indicating devices for
10 receiving the signals.

The object of the invention is to provide simple and reliable means whereby annunciators having a plurality of independent numbers or signs may be operated with great
15 rapidly from the different transmitting stations.

The object also is to reduce the number of line-wires, which is an expensive part of such
20 an apparatus.

Heretofore the great number of wires required to operate annunciators of the class I propose to employ (which are similar to those
25 used in telephone-exchanges) have prevented their adoption for signaling purposes of this kind—viz., fire or burglar alarms.

The invention consists, partly, in electrically operating or controlling motors at the receiving-stations by a controlling-motor at one of the receiving-stations or a central station, so that all of said motors will operate synchronously to rotate the trailing fingers which traverse corresponding circular tables of contacts, and cause said fingers at the respective
30 receiving-stations to pass simultaneously on corresponding contacts. The contacts are insulated from each other and connected by separate branch wires with the magnets of the
35 annunciators and lines.

My invention consists, also, in the employment of two line-wires, one to operate or control the motors and sound the gongs, and the other to release and stop the controlling motor or pulsator; send an electric impulse at the proper moment to actuate the annunciators, render all the transmitting-stations inoperative or non-interfering with the one in
40 operation, and for sending special signals when required.

In the accompanying drawings, Figure 1 is a diagram showing the general organization

of the apparatus and circuits therefor. Fig. 2 is a modification of the same. Fig. 3 is a face view of the pole-changing or make-and-break wheel at the central station. Fig. 4 is a side elevation of a portion of the transmitting apparatus. Fig. 5 is a portion of the side elevation of the receiving apparatus. Fig. 6 is a modification of the means for operating
55 a receiving-motor. Fig. 7 is a horizontal transverse section of a signaling-box, showing the means for operating the signaling mechanism automatically with the opening of the door; and Fig. 8 is a sectional elevation of the
60 dash-pot.

Referring specifically to the figures, A represents the motor at the central-station S, which motor may be of any suitable construction for rotating the shaft B. The said motor
65 may be in constant operation, but is preferably in operation only when the shaft B is released, as hereinafter described. It is preferred that the shaft should be rotated at a uniform speed, but this is not essential. It
70 should, however, make a complete revolution in as short a time as practicable, say about ten or fifteen seconds. Any suitable means may be employed to regulate said motor, as
75 required.

Upon the shaft B in Fig. 1 is carried a pulsator or pole-changing device C, which is preferably of the form of a wheel having two metallic circumferential rims *c'* and *c''* arranged side by side, insulated from each
80 other and from the shaft, and each of said rims carrying in its outer periphery a series of insulating-blocks *c'''*, distributed uniform distances apart around the periphery, and the insulating-blocks of one of said rims being
85 disposed opposite the metallic portions of the other rim. Against the sides of the two metallic rims *c' c''* rest two contact springs or brushes 7 7, connected, respectively, by means of conductors *w' w''* with the positive
90 and negative poles of two batteries *b'* and *b''*. The other poles of these batteries are connected with the line *L'*, but may be connected with ground when not employing a complete
95 metallic circuit. A contact-brush *c* rests on the peripheries of the described pole-changing device C, and this brush makes alternate contact with the metallic portions of the two
100 rims, thereby causing, when the pulsator is

in motion, electric impulses of alternating polarity to be transmitted on the line L' from the batteries b^1 and b^2 to the following-described annunciating apparatus at the receiving-station R. Said annunciating apparatus consists of an annulus E of insulated contacts e, e', e'', e''' , &c., arranged stationary on a suitable support. Central of said annulus and at right angles to the plane thereof is a shaft G, which is rotated by a suitable motor and has firmly attached to it a trailing finger F and a ratchet-wheel H. Said finger is composed of metal and insulated from the shaft, and has its free end over the annulus E and in contact therewith, preferably by means of a brush f , attached to said finger. The motor consists, preferably, of a duplex pawl H', adapted to engage and release the ratchet-wheel H alternately at two diametrically-opposite points, and thereby impart rotary motion to said wheel and its shaft G. Said pawl is operated by magnets I I at opposite sides of a polarized armature h on the shank of the pawl. When the receiving-instrument is at rest or in its normal condition, the brush f of the finger rests upon a contact e , which is in direct connection with the line L'' by branch l , and keeps the line L'' closed through the instrument and shunts the annunciator D. Said annunciator is preferably of a form similar to those in telephone-exchanges—i. e., each number or sign (represented in the form of drops 1 2 3 in the drawings) is operated by a separate electro-magnet m' m'' m''' . These magnets are in separate branches l', l'', l''' of the main line L'' , and each of said branches is terminated in one of the contacts e', e'', e''' of the annulus E. The other terminal of the main line L'' is connected to a brush d , bearing on the metallic hub of the trailing finger F.

The magnets I I are in the line-circuit L' , hereinbefore referred to, and the electric impulses of alternating polarity transmitted on said line, as hereinbefore described, cause the said magnets to attract and repel alternately the polarized armature h , and thereby vibrate the duplex pawl H', so as to impart rotary motion to the shaft G and trailing finger F, attached thereto.

$S^1 S^2$ represent transmitting-stations, which may be fire-alarm-signal boxes. At said stations I employ the following apparatus, which is illustrated in its normal position at S^1 in Fig. 1 of the drawings, and in its operative position at S^2 in said figure. Said apparatus consists of a circuit making and breaking wheel J, fixed to a rotatable shaft G, which receives rotary motion by a ratchet-wheel H, attached to said shaft, and a duplex pawl H', engaging said ratchet-wheel and actuated by magnets I I in the same manner as in the instrument R at the receiving-station, hereinbefore described. The wheel J is composed of a metallic body, from the periphery of which project two lugs or tenons j and j' , and, if desired, an insulating rim or band i may

be applied to the remaining portion of the periphery of the wheel, as shown in the drawings. The shaft G and wheel H are in the line-circuit L'' . On the same shaft is rigidly mounted the stop-disk K of metal, which disk is provided with a notch q in its periphery.

A detent M, of the form of a two-armed lever, is pivoted at the junction of its arms to a suitable support, and one arm thereof is formed with a hook, by which it is adapted to engage the notch q . A spring s serves to draw said arm toward the disk K, so as to insure the engagement of the aforesaid hooked arm. The other arm of the detent M carries on its end an insulated contact-spring n , which is in contact with a stop n' when the apparatus is in its normal condition.

The spring n and stop n' form terminals of a shunt path for the current around the magnets I, and is open only when that particular transmitting apparatus is in operation.

The described detent is provided with a suitable handle a , by which the operator can throw the detent out of engagement with the notch q when desired to send a signal. A stop a' back of the detent prevents excessive movement thereof. A suitable electric contact bears on the periphery of the circuit making and breaking wheel J, said contact being represented in the annexed drawings of the form of a metallic spring-arm r' , secured at one end to a suitable stationary support and in the line-circuit L'' , and having pivoted to its opposite end a metallic roller r , which is carried in the path of the lugs or tenons j and j' of the circuit making and breaking wheel J. When said wheel is at rest or in its normal position, the roller r rests on the tenon j . The distance between the tenons j and j' corresponds to the distance between the contacts e and e' of the receiving-instrument R, and the contact e' is electrically connected with the magnet m' , which operates the drop 1, bearing the number corresponding to that of the station S^1 .

It will be observed that the circuits L' and L'' are normally closed. By throwing the detent out of engagement with the stop-disk K the shunt around the magnets I is broken by the consequent separation of the terminals n and n' , before mentioned, and the circuit L'' is broken between the detent M and disk K. To the shaft B of the pulsator or pole-changer is firmly secured a stop-disk K', similar to the disk K, as shown in Fig. 3 of the drawings, and a detent M' is held in engagement with the disk K' by an electro-magnet N, attracting an armature fixed to said detent, said magnet being in the circuit L'' , and a spring o serves to lift the detent out of engagement with the disk K' when the magnet N is de-energized.

When the operator throws the detent M out of engagement with the stop-disk K at the transmitting-station, as represented at S^2 in Fig. 1 of the drawings, the circuit L'' is broken, as before stated, and in consequence

thereof the magnet N is de-energized, allowing the spring *o* to lift the detent M' out of engagement with the stop-disk K'. The pulsator C being thus released, allows the motor A to rotate said pulsator and stop-disk, and during the rotation thereof positive and negative impulses are sent alternately through the line L', and said impulses actuating the magnets I I at station S², where the shunt is broken, as before stated, and also the magnets I I of the receiving-instrument R, in consequence whereof the circuit making and breaking wheel J at station S² and the trailing finger F at the receiving-station R are rotated synchronously. The circuit making and breaking wheel is allowed to make a complete revolution, and is arrested in its movement by the automatic re-engagement of the detent M with the stop-disk K. During said movement of the wheel J the tenon *j*, moving away from the roller *r*, breaks the circuit of the line L'' at that point, and remains broken until the tenon *j'* comes in contact with the roller *r*, which closes the circuit of the line L'' for a brief period of time. When said circuit is closed, an electric impulse is sent through the trailing finger F, thence through the contact *e'*, directly under said finger, and thence through magnet *m'* of the annunciator D.

The detent M, after being withdrawn from the disk K, is immediately released and drawn toward the disk by the spring *s*, and rides on the periphery of the rotating disk, which holds the shunt around magnets I open until the said disk has made a complete revolution, when it is arrested by the detent falling into engagement with the notch or stop *q*, and the shunt is thereby closed.

In order to guard against the re-engagement of the detent M with the stop *q* on the disk K by a very quick release of the detent after being withdrawn, I pivot on the shaft of the said disk an arm *t*, the free end of which rests normally on the detent, and when said detent is thrown out of engagement therewith the arm *t* falls onto a stop *t'* on the disk and is held there by a spring *t''*. This arm being under constant strain of the spring, is caused to quickly fall into the path of the detent when thrown out, as aforesaid, and thus prevents the re-engagement of said detent with the stop *q*. The end of the arm is tipped with insulation to prevent the reclosing of the circuit L'' between the detent M and disk K before said circuit is broken between contact-roller *r* and point *j*, caused by the rotation of the make-and-break wheel J, thus preventing the magnet N from attracting the detent M' at the central station St, which otherwise would act as a brake at the commencement of the movement of the pole-changer, and thus retard the same. The spring-actuated arm *t* also serves to cushion the contact between the detent M and stop *q*, so as to prevent concussion and undue strain.

The transmitting-station S² shows the posi-

tion of the apparatus just after detent M is withdrawn. The ratchet-wheel is shown as having moved half a tooth, and the ratchet-wheel also of the receiving apparatus R moved correspondingly.

The change of position of the apparatus at the central station St is indicated by the dotted lines.

In order to promptly call attention to the annunciator when operated, I employ at the receiving-station, as well as at the transmitting-station, a suitable gong-signal, which is represented in the annexed drawings of the form of two gongs *g g*, between which plays a hammer *g''*, attached to the duplex pawl-arm H', which is provided with the armature *h*. At the central station a simple polarized relay *g'* in circuit L' operates the gong.

For special signaling I employ at the receiving-station R a special sounding mechanism *w^x*, the hammer of which is operated by a spring and electro-magnet, which latter is in the circuit L''. At the transmitting-station I employ an extra key *w*, which is in a normally-closed shunt around a resistance *w'* in the said circuit, and by depressing said key the shunt is broken, the current is switched through the said resistance, and the intensity of the current is decreased, thereby partly de-energizing the magnet of the sounding mechanism *w^x* and allowing the spring thereof to draw the hammer against the gong. The circuit L'' remaining unbroken obviates interference with the general signaling system, inasmuch as sufficient current is allowed to flow in the circuit when the shunt is open to retain the detent M' in engagement with its disk K', and so prevent the pole-changer and receiving-instruments from operating.

When the transmitting mechanism is inclosed in a box provided with a door, a tripping device may be arranged to release the said mechanism automatically with the operation of opening the door. An exemplification of such tripping device is illustrated in Fig. 7 of the drawings, which merely shows a section of the box with its door and the stop-disk K, circuit making and breaking wheel J, and detent M in connection with the tripping device, which consists of a stationary double cam 8 at or near the side of the detent facing the stop-disk and a duplex cam 9, attached to the free end of a spring-arm 10, attached to the door. The cam 9 is drawn between the cam 8 and detent M in the operation of opening the door, and thereby crowds the detent away from the cam 8 and out of engagement with the stop *q* of the disk K. In closing the door, the cam 9 passes the cam 8 at the farthest side from the detent M, and thus avoids interference with the detent.

The transmitting apparatus may be released from a distance by means of an electro-magnet 1, placed opposite an armature *k* on the detent M. The wires 2 and 3 lead from said magnet to one or more sub-stations *o o* in the vicinity of the signaling-box. A battery

4 is in circuit at the sub-station nearest the box, and the keys 5 and 6 of said sub-stations are placed in circuit in multiple arc. The said keys are all normally open; but when it is desired to release the mechanism of the signaling-box the key at either of the sub-stations may be used to close the circuit, thereby energizing the magnet 1 and attracting the armature *k* on the detent and removing the latter from engagement with the stop-disk K. The key should be depressed or closed for but a brief period of time.

The effect produced by the circuit being open almost continually during the operation of a signaling-box I utilize to render the remaining boxes in the circuit inoperative or non-interfering, as follows: In the line-circuit L' and within each signal-box is a magnet P, which attracts a lever *p* when the circuit is closed and holds said lever out of the path of the detent M; but when the circuit is broken at a box, the magnet P in each of the other boxes being demagnetized, allows the spring *s'* in said box to draw the lever *p* in the path of the detent, so that the detent cannot be moved out of engagement with the stop-disk. In order to retain the mechanism in the latter boxes locked, as aforesaid, while the contact *j'* passes the roller *r* in the operating-box, I employ a dash-pot Q, suitably connected with the lever *p*, so that the said lever will not be able to return to the magnet quick enough to release the detent M during the brief closing of the circuit, but will freely and quickly move in the opposite direction when released by the magnet. Fig. 8 shows the dash-pot constructed to operate in this manner. When the piston 11 descends in the pot Q, the ball 12 will rise, thereby opening the aperture in the piston to permit the fluid in the pot to flow freely through the aperture, which consequently allows a free movement of the piston downward; but when the piston ascends the ball closes the aperture and the fluid is compelled to pass around the sides of said piston, which is made to follow quite closely within the pot and permit said fluid to pass slowly, thereby retarding the movement of said piston upward. The said dash-pot may contain oil or other liquid that will not freeze or evaporate readily, or simply air may be employed in place of the liquid, as is well known.

As the circuit is not broken until the detent M is moved over the lever *p*, the latter lever will not interfere with the operation of a box unless another is already in operation. An annunciator D at the central station St may be operated in the same manner as that at the receiving-station R, by attaching the trailing finger F to the pulsator-shaft B and securing the annulus E to one of the pedestals P', carrying said shaft, which latter is brought into the circuit L'' by a brush *d*, attached to one of the terminals of the circuit and bearing on the hub of the trailing finger F, the magnets *m'* *m''* *m'''* of the

annunciator being electrically connected with the annulus E in the same manner as hereinbefore described.

Fig. 2 shows the pulsator of the form of a single make-and-break wheel C^x, with a single battery *b*^x connected therewith. The said wheel when rotated makes and breaks the current in circuit L', including at the receiving-station an electro-magnet I^x, which actuates a pivoted pawl H^x, engaging the ratchet-wheel H and by the aid of the dog *a*^x rotating the trailing finger F.

Instead of operating the mechanism at the receiving-station directly by currents in the main line, a relay R^x and local circuit L^x, including the magnets I I, may be arranged as shown in Fig. 6 of the drawings. The said relay is in the circuit L' and is actuated by the alternating current therein and alternately reverses the current in the local circuit through the magnets I I, disposed at opposite sides of the arm of the pawl H'. It will be obvious that a neutral relay in circuit L' of Fig. 2 may control a local current to vibrate the pawl H^x also.

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

1. An electric signal-transmitting instrument composed of a rotatable shaft, a wheel mounted on said shaft and having circuit making and breaking points in its periphery, an electric contact bearing on said periphery, a stop-disk connected to the aforesaid shaft, and a detent adapted to engage and release said stop-disk, all in one and the same circuit, and a motor in another circuit rotating the aforesaid wheel and disk, as set forth.

2. In an electric signaling system, the combination of a plurality of transmitting-stations in circuit, each adapted to transmit a predetermined signal, one or more receiving-stations also in circuit, a suitable electric generator, a pulsator in said circuit therewith, a motor operating said pulsator, a motor at a receiving-station propelled by the pulsating currents in the circuit, an annulus of contacts, a trailing finger in another circuit rotated by the latter motor and traversing successively said contacts; a suitable annunciator at the receiving-station in circuit and having independent magnetic devices in branches of the circuit connected with the contacts on the annulus, a motor at the transmitting-station operated by the pulsating currents, and means at each of the transmitting-stations for sending an electric impulse at a predetermined moment operated by said motor.

3. In an electric signaling system, the combination of a plurality of transmitting-stations and one or more receiving-stations in a line-circuit, a suitable source of electricity and pulsator therefor in said circuit, a motor operating said pulsator, a motor at the receiving-station operated by the pulsating current, an annulus of contacts at said station, a trailing finger in circuit rotated by the latter motor

and traversing successively said contacts, a suitable annunciator at the receiving-station having independent electro-magnetic devices in branches of a circuit connected with the contacts on the said annulus, and a magnet in the latter circuit to operate the detent for releasing and stopping the said pulsator and controlled by the circuit makers and breakers at the transmitting-stations, and means at each of the transmitting-stations for transmitting an electric impulse at a predetermined moment to actuate the said annunciator.

4. In an electric signaling system, the combination of a plurality of transmitting-stations and a plurality of receiving-stations in a line-circuit, a suitable source of electricity, a pulsator therefor at a station in said circuit, a motor operating said pulsator, a motor at each of the receiving-stations actuated synchronously by the pulsating current, an annulus of insulated contacts at each of said stations, and trailing fingers in circuit traversing successively the said contents and rotated by the motors thereat, a suitable annunciator at each receiving-station operated by electro-magnets in branches of a circuit connected with the contacts on the annulus, a magnet in the circuit to operate a detent for releasing and stopping the said pulsator and controlled at the respective transmitting-stations, and means at each of the latter stations for transmitting an electric impulse at a predetermined time during the movement of the trailing fingers to actuate a particular magnet of the annunciator.

5. An electric signaling system consisting of two line-circuits, a pulsator in the first of said circuits, a motor operating the pulsator, circuit-controlling wheels at the respective transmitting-stations in the second of said circuits, electric contacts in said second circuit bearing on the aforesaid wheels, an annulus of electric contacts at the receiving-station in the same circuit, a trailing finger also in said circuit traversing the annulus, an annunciator operated by magnets in branches of said circuit connected with the respective contacts of the annulus, motors at the respective transmitting-stations in the pulsator-circuit and operating the circuit-controlling wheels at said stations, a motor at the receiving-station in the pulsator-circuit and operating the trailing finger, and means for locking and unlocking the circuit-controlling wheels at the transmitting-stations.

6. In an electric signaling system, the combination of two line-circuits, a pulsator in the first of said circuits, a motor operating the pulsator, circuit-controlling wheels at the respective transmitting-stations and in the second of said circuits, electric contacts in the latter circuit bearing on said wheels, stop-disks rotating, respectively, with said wheels and in circuit therewith, detents adapted to

engage and release the stop-disks, motors in the first circuit operating the aforesaid stop-disks and circuit-controlling wheels, shunts around said motors controlled by the aforesaid detents, an annulus of electric contacts at the receiving-station in the second circuit, a metallic trailing finger traversing the contacts of the annulus and in circuit therewith, an annunciator operated by magnets in branches of said circuit connected with the respective contacts of the annulus, and a motor in the first circuit operating the trailing finger, substantially as set forth.

7. In an electric signaling system, the combination of two line-circuits, a pulsator in the first circuit, a motor operating said pulsator, circuit-controlling wheels at the respective transmitting-stations and in the second circuit, electric contacts in the latter circuit bearing on said wheels, stop-disks rotating, respectively, with said wheels and in circuit therewith, detents adapted to engage and release the stop-disks, motors in the first circuit at the transmitting-stations for operating the stop-disks and circuit-controlling wheels, levers adapted to lock the detents in their engagement with the stop-disks, springs drawing the levers into their locking positions, a stop-disk attached to the pulsator-shaft, a detent adapted to engage the latter stop-disk, a spring holding said detent out of engagement, and magnets in the second circuit, and when energized moving the latter detent and aforesaid levers in opposition to their respective springs, substantially as set forth and shown.

8. In combination with rotary circuit making and breaking wheel and stop-disk rotating therewith, and the detent adapted to engage and release said stop-disk, a lever adapted to lock the detent in its engagement, a spring holding the detent in its locking position, an electro-magnet in circuit adapted when energized to throw the lever out of its locking position, and a dash-pot connected with the lever to retard its action under the influence of the magnet, as set forth.

9. In combination with rotary stop-disk and circuit making and breaking wheel rotating with said disk and in one and the same circuit, a motor in another circuit operating said disk and wheel, and a detent adapted to engage and release the stop-disk and in circuit with the latter, an armature attached to the detent, an electro-magnet in a local electric circuit opposed to said armature, and operating-keys in said local circuit, as and for the purpose set forth.

In testimony whereof I have hereunto signed my name this 13th day of March, 1889.

MARK W. DEWEY. [L. S.]

Witnesses:

J. J. LAASS,

C. L. BENDIXON.