(No Model.) 2 Sheets—Sheet 1.

J. C. WILSON.

LIGHT SIGNAL SYSTEM.

No. 433,505. Patented Aug. 5, 1890.

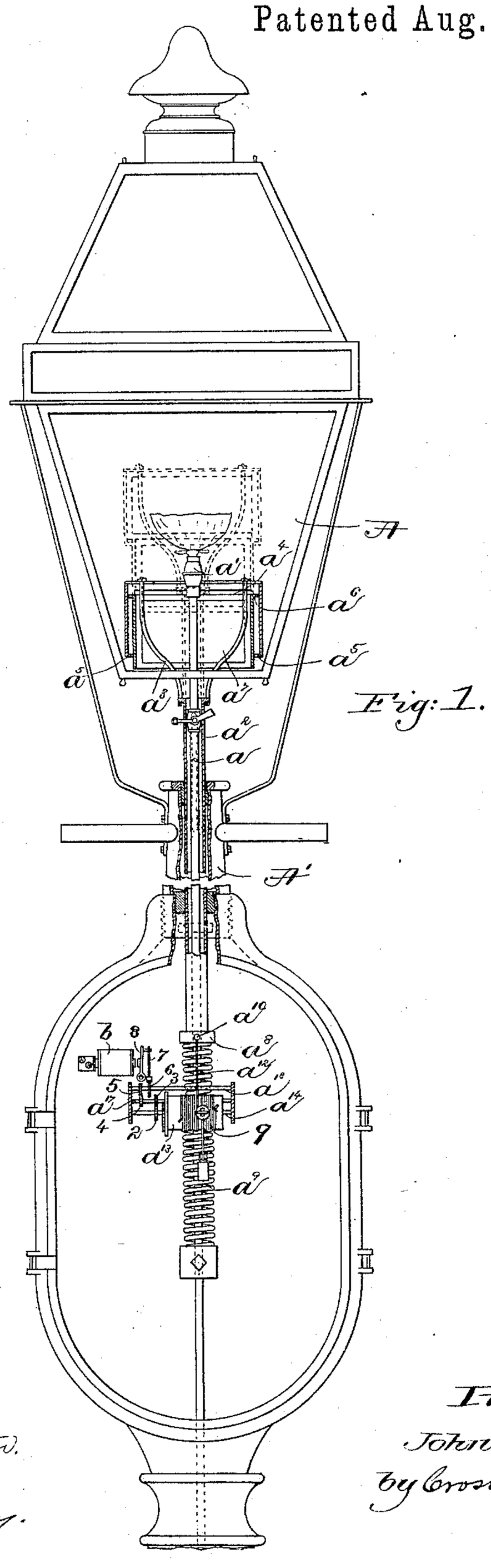
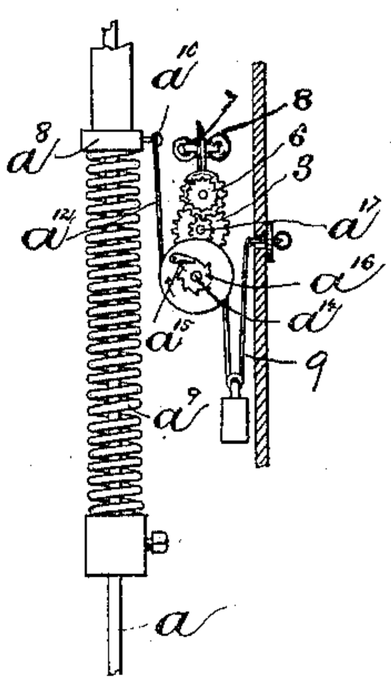


Fig: 1.

Fig: 2.



Witnesses.
Howard F. Eaton.
Frederick L. Emery.

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(No Model.) 2 Sheets—Sheet 2.

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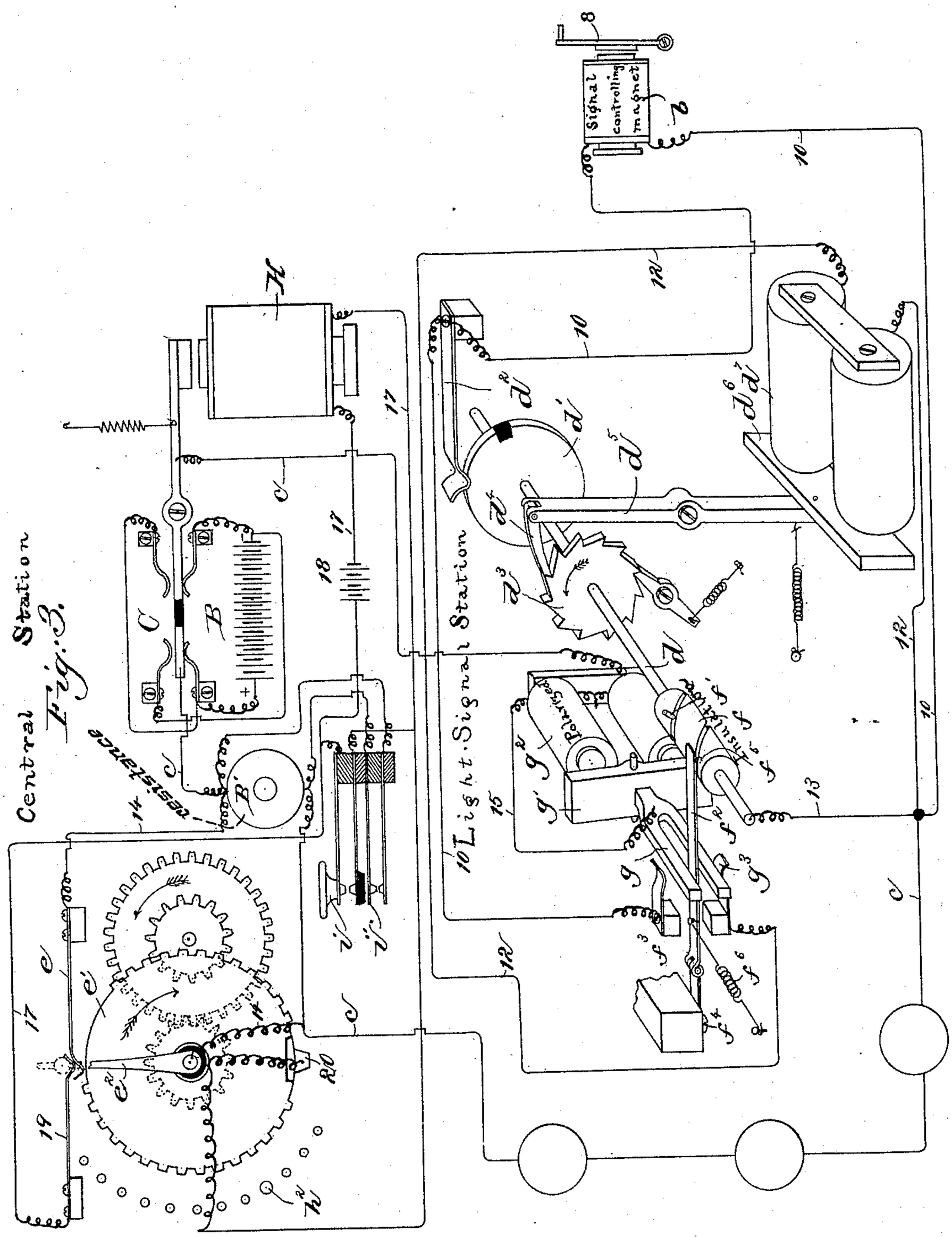

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UNITED STATES PATENT OFFICE.

JOHN C. WILSON, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE MUNICIPAL SIGNAL COMPANY, OF PORTLAND, MAINE.

LIGHT-SIGNAL SYSTEM.

SPECIFICATION forming part of Letters Patent No. 433,505, dated August 5, 1890.

Application filed November 24, 1888. Serial No. 291,776. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. WILSON, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Light-Signal Systems, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to construct an individual light-signal system especially adapted for police-signaling purposes wherein a series of light-signals are arranged on a single wire and operable independently by means located at the central office.

In accordance with this invention the light-signal which I preferably employ consists of a two-part colored-glass globe or screen adapted to be raised to inclose a gas-jet or other illuminating-flame, and a motor mechanism is employed to raise the said two-part globe or screen, which is released by an electro-magnet. The releasing electro-magnets of several light-signals are included in open branches of a single circuit, and are designed to be effected by closing the said branches and thereafter increasing the strength of the current. A device is also provided for bringing all the step-by-step devices to unison or to set them in a predetermined position with each operation, as will be hereinafter more fully described.

Figure 1 shows a light-signal such as I prefer to use. Fig. 2 shows a detail of the motor mechanism. Fig. 3 shows in diagram the independently-operable step-by-step devices at one of the light-signal stations; also, the releasing electro-magnet of the light-signal and the unison employed at each station, and the apparatus at the central station for operating the electro-magnetically movable step-by-step devices and controlling the light-signal.

The light-signal which I prefer to use consists of an ordinary lantern A, mounted in usual manner on the top of the post A′ and inclosing the gas-pipe a and tip a'. A tube a^2 surrounds the gas-pipe a, and is adapted to be moved vertically, said tube supporting at its upper end, as by a bracket or frame a^3, a colored-glass globe or screen a^4. The globe or screen a^4 consists of a metallic frame having side walls of glass, and the said frame at its lower end has an inwardly-turned flange a^5, which as the globe is raised engages a corresponding outwardly-turned flange a^6 of a similar colored-glass globe or screen a^7, contained within the globe or screen a^4, and raises the said globe or screen a^7 telescopically. By this arrangement a two-part globe or screen is formed which, when in its normal position, offers no obstruction to the rays of light and affords no distinguishable signal, except when inclosing the illuminating-flame.

At the lower end of the tube a^2 a collar a^8 is secured, which rests upon or is secured to a spiral spring a^9, also encircling the gas-pipe, the said spring when the two-part globe is in its normal position being compressed. The collar a^8 has a pin a^{10}, to which is fastened a cord a^{12}, which passes around a drum a^{13}, loosely mounted on a shaft a^{14}. Upon one end of the drum a pawl a^{15} is attached, which engages the teeth of a ratchet-wheel a^{16}, secured to the shaft a^{14}. A gear-wheel 2 is fixed to the shaft a^{14}, which engages a gear-wheel 3, fixed to a shaft a^{17}, and a gear-wheel 4 is fixed to the shaft a^{17}, which engages a gear-wheel 5, fixed to a shaft a^{18}, which revolves with an escape-wheel 6, fixed to the shaft a^{18}, which has co-operating with it a suitable pallet 7. The armature 8 of the electro-magnet b has a pin which engages the pallet, so that when the armature is attracted toward the poles of the said magnet the pallet will be released. This train of gearing serves to hold the spring compressed, and when released serves as a retarding device for the upwardly-moving tube. Another or independent cord 9 is wound around the drum a^{13} in a direction opposite to that of the cord a^{12}, and as the drum is rotated or the tube is moving upwardly the said cord 9 will be wound, and when it is desired to keep the tube down the cord 9 will be drawn to thereby rotate the drum a^{13} in the opposite direction and wind upon it the cord a^{12}.

Each light-signal station will have a light-signal and operating mechanism similar to that just described, the electro-magnets b serving as the release-magnets. The electro-magnet b at each light-signal station is in-

cluded in a branch wire 10, leading from the main-line wire *c;* but said magnet is short-circuited by the wire 13, leading from the main-line wire *c* and extending through a shaft *d*, circuit-wheel *d'*, and pen d^2. A ratchet-tooth wheel d^3 is also fixed to the shaft *d*, which is engaged by a pawl d^4, loosely connected with the upper end of a pawl- carrying arm d^5, which has at its lower end an armature d^6 of the electro-magnet d^7. The electro-magnet d^7 is included in a branch wire 12, leading from the main-line wire *c*. The electro-magnet d^7 is employed to move the shaft *d* forward step by step and is energized by an increase in the strength of the current. To effect this result at the central station, a main battery B is included in the line, and also a heavy resistance-coil B'.

At the central station a wire 14 leads from the main-line wire *c* at one side of the resistance-coil B' and including the pen *e*, circuit-wheel *e'*, and connecting with the main line *c* at the opposite side of the said resistance-coil, thereby when closed serving as a shunt for the resistance-coil and increasing the strength of the current. The circuit-wheel *e'* will be understood as being revolved by any suitable motor mechanism, preferably set in operation by a pull, and a pointer or arm e^2 is fixed to the shaft to which the said circuit-wheel is attached, and as the circuit-wheel is revolved its projections, making contact with the pen *e*, close the shunt 14, thereby cutting out the resistance-coil B', and for each impulse of increased tension the electro-magnet d^7 will respond. A spirally-grooved hub *f*, of insulating material, is fixed to the shaft *d*, it having at a determined point a stop-pin *f'*, and an arm f^2, hinged at f^3 and pivoted at f^4, is provided on its under side with a pin f^5, which follows in the spiral groove of said hub *f*, so that as the hub is revolved by the shaft *d* the arm f^2 will be swung on its pivot f^4. The arm f^2 occupies a position between the arms of the forked lever *g*, fixed to a pivoted armature *g'* of a polarized electro-magnet g^2, and when said armature *g'* is moved from its normal position, as herein shown, to its abnormal position the arm f^2 will be raised sufficiently to remove its pin f^5 from the groove of the hub, and when the arm is thus lifted the spring f^6 acts to swing the arm f^2 on its pivot f^4 back to its normal position, so that as the arm *g'* is restored to its normal position the pin f^5 of the arm f^2 will again enter the groove of the hub *f*. This pivoted and hinged arm f^2 and the means herein shown for moving it constitute the unison.

I have herein shown the ratchet-wheel d^3 as having twelve teeth, and hence twelve impulses will effect a complete rotation of the shaft *d* and will move the arm f^2, so that its pin f^5 will bear against the stop-pin *f'* of the hub; but I have herein shown the circuit-wheel *e'* as having fifteen projections, so that in case of any accident all the ratchet-wheels of the light-signal stations will, upon the occurrence of fifteen successive impulses, arrive at unison-point.

To effect the operation of the unison, the main circuit *c* includes the battery B, the shunt 14, or the resistance-coil B' at the central station, and the branch wire 12, contact-spring g^3, forked lever *g*, wire 15, polarized electro-magnet g^2, and at the completion of the fifteen impulses the polarity of the line is reversed. This is accomplished, as herein shown, by providing at the central station a battery-reversing instrument C and an electro-magnet H for operating it, the said electro-magnet being included in a local circuit 17, containing a local battery 18, a contact-pen 19, and a projection 20, secured to insulating material on the circuit-wheel *e'*. When the said circuit-wheel *e'* arrives at a position whereby the projection 20 makes contact with the pen 19, the local circuit 17 is closed, energizing the electro-magnet H and changing the battery-reversing instrument or pole-changer C. At such time the polarized electro-magnet g^2 is affected, and the lever *g* lifted to thereby permit restoration of the parts, as above described. It will be seen that when the pole-changer C is operated the polarized electro-magnets at all the light-signal stations will be affected simultaneously, so that all the circuit-wheels, as *d'*, will occupy the same relative position, called "unison-point."

The circuit-wheels, as *d'*, for each box have a single notch or insulated portion, each arranged at a different distance from unison-point, but corresponding with the teeth of the ratchet-wheel, the circuit-wheel herein shown having its insulated portion to correspond with the fourth tooth of the ratchet-wheel, thereby requiring four impulses to move the shaft *d* sufficiently to bring the insulated portion beneath the contact-pin d^2. As I have provided the ratchet-wheel with twelve teeth I may employ on the circuit twelve different light-signal stations, and the circuit-wheel *e'* at the central office has, in addition to the projections heretofore described, twelve projections, and a dial-plate is provided having holes to receive a pin, as h^2, which will be struck by the pointer e^2 in its rotation, to thereby stop the circuit-wheel at any point desired, the pin being herein shown as placed in a hole which when struck by the pointer will stop the circuit-wheel after it has rotated sufficiently to transmit, in addition to the fifteen unison impulses and the one pole-changer impulse, four impulses, to thereby bring the insulated portion of the circuit-wheel *d'* beneath its contact-pen.

When the circuit-wheel *d'* occupies a position whereby its insulated portion is beneath its contact-pen, the circuit 13 of the branch 10 will be opened, and it then remains to close the branch 10 and energize the electro-magnet *b*. To close this branch 10, the forked lever *g* is lifted by reversing the pole-changer it being accomplished by depressing the key *i* to close the local circuit 17, and thereby

energize the electro-magnet H, and to energize the electro-magnet *b* and release the light-signal (it being understood that it is responsive only to a current of considerably greater strength than the normal strength of the line) the resistance-coil B′ is shunted out by the key *i′*, which closes a branch around the said coil. I have herein shown the keys *i i′* as arranged one above the other, so that the pressure of one effects the closing of both, so that the pole-changer will be operated and the resistance-coil B′ shunted in succession. It will be seen that just as soon as the pole-changer is affected by the movement of the key *i* the forked lever *g* will be lifted, thereby opening the branch 12, and hence immediately thereafter increasing the strength of the current has no effect upon the electro-magnet d^7. By removing the pin h^2 the circuit-wheel *e′* completes its rotation, and also completes the rotation of the shafts, as *d*, at all the light-signal stations.

I do not herein broadly claim the combination of an electric circuit, a main station, and a series of sub-stations therein, each sub-station containing a light-signal, an electro-magnet controlling its operation, and an electro magnetically-movable step-by-step individual call-switch controlling the circuit of the said light-signal-operating magnet, and a circuit-changing device at the main station by which said stitches are controlled, as the same is shown in another application, Serial No. 252,335.

I claim—

1. In a light-signal, the lantern and burner, combined with the screen a^4, having the inwardly-turned flange a^5, and the screen a^7, contained within the screen a^4 and having the outwardly-extended flange a^6, substantially as described.

2. In a light-signal, the lantern and burner, combined with the two-part telescopically-arranged screen, its vertically-movable support, the spring a^9, and the train of gearing serving as the retaining device for the spring and as a retarding device for the vertically-movable support, substantially as described.

3. In a light-signal, the lantern and burner and vertically-movable screen, combined with the spring a^9, the drum a^{13}, and connecting-cord, and the train of gearing, and the cord 9, wound upon the drum in a direction opposite to the connecting-cord, substantially as and for the purposes specified.

4. In a light-signal system comprising a main station and several light-signal stations connected by an electric circuit, the releasing-magnets, as *b*, included in branch circuits, the electro-magnetically-movable step-by-step devices included in other branch circuits and normally forming a shunt for the releasing-magnets, and polarized magnet-controlling switch *g* for closing the branch circuits, containing the releasing-magnets and opening the branch circuits containing the operating electro-magnets of the step-by-step devices, combined with the circuit-changing devices at the central station for effecting the operation of the electro-magnets of the step-by-step devices, a battery-reversing instrument for effecting the movement of the polarized magnet-controlling switch *g* and other circuit-changing devices for effecting the operation of the releasing-magnets, as *b*, substantially as described.

5. In a light-signal system comprising the main station and light-signal stations connected by an electric circuit, the combination, with the releasing electro-magnets *b*, electro-magnetically-movable step-by-step individual call devices for independently including in the circuit the said releasing-magnets, and a unison, substantially as shown and described, for said individual call devices, of a circuit-changing device at the main station for effecting the operation of the electro-magnetically-movable step-by-step individual call-switches and moving the unison into abnormal position, and an instrument at the main station for transmitting impulses of different character for restoring the unison and also for operating the releasing-magnet, which is properly included in the circuit by the individual call device, substantially as described.

6. In a light-signal system comprising a main station and several light-signal stations connected by an electric wire, the combination, with the releasing-magnets *b*, included in branch circuits, and individual call-switches included in other branch circuits short-circuiting the said releasing-magnets, electro-magnets included in other branch circuits for moving said individual call-switches, and a polarized magnet-controlling switch, as the lever *g*, for closing the branch circuit containing the releasing-magnets and for opening the branch circuit containing the electro-magnets of the individual call-switches, and the unison, substantially as described, of the circuit-changing device, as *e e′*, at the main station, and the resistance-coil B, the pole-changer, and the keys *i i′*, substantially as and for the purposes set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN C. WILSON.

Witnesses:

JAS. H. CHURCHILL,

FRED. L. EMERY.