(No Model.) 2 Sheets—Sheet 1.

# S. S. BOGART & M. B. LEONARD.

## ELECTRICAL APPARATUS FOR CONTROLLING SIGNALS.

No. 529,059. Patented Nov. 13, 1894.

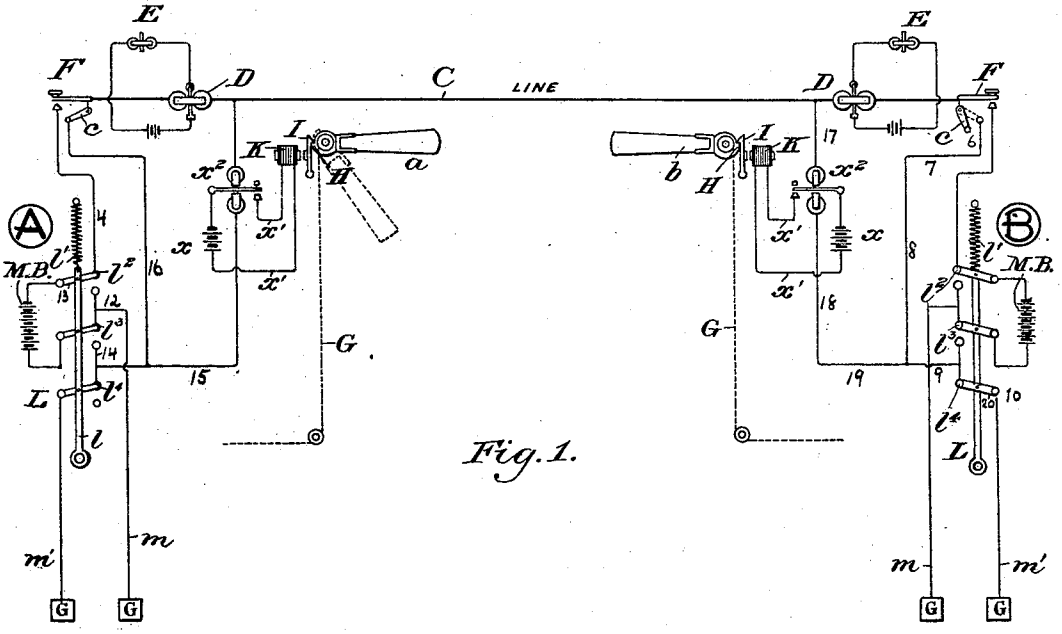
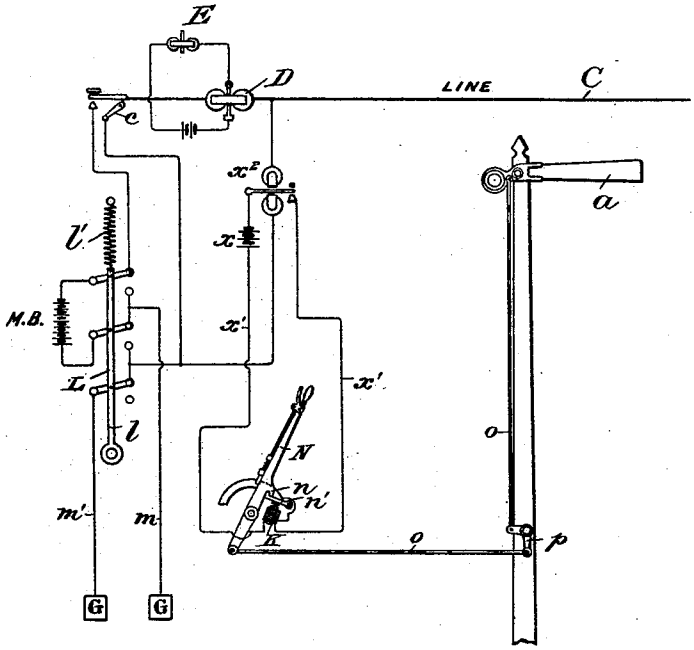



Fig. 1.

Fig. 3.




Witnesses
L. A. Connor Jr.
Chas. E. Riordon.

Inventors
S. S. Bogart et al
M. B. Leonard.
By Butterworth & Dowell Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

# S. S. BOGART & M. B. LEONARD.

## ELECTRICAL APPARATUS FOR CONTROLLING SIGNALS.

No. 529,059. Patented Nov. 13, 1894.

Fig. 2.

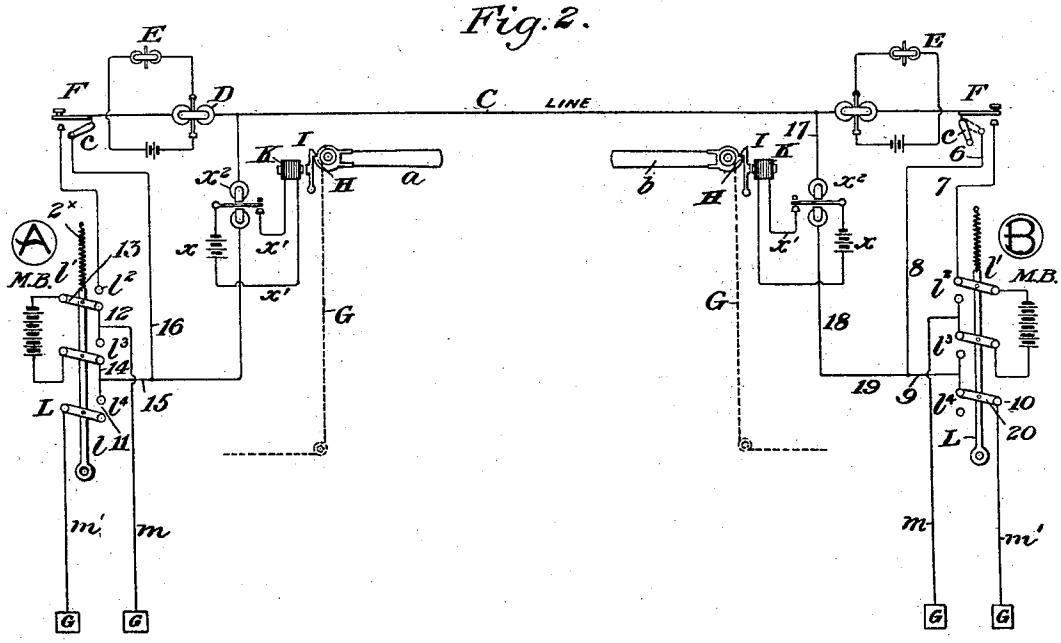
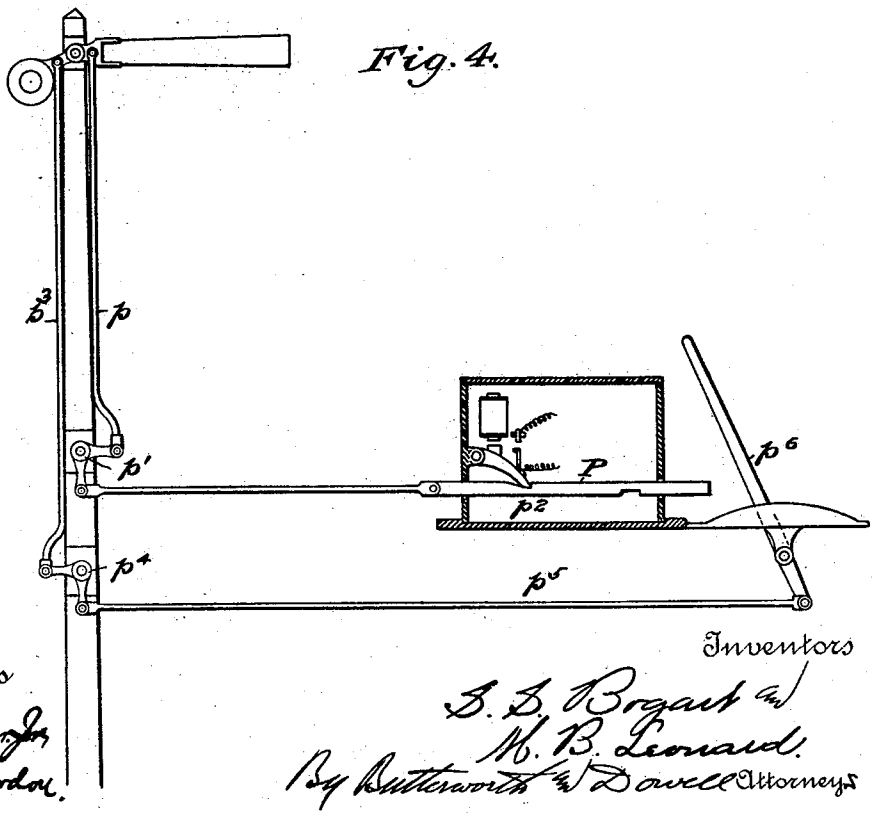



Fig. 4.




Witnesses
T. A. Commings
Chas. E. Riordan.

Inventors
S. S. Bogart and
M. B. Leonard.
By Butterworth & Dowell Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

SAMUEL S. BOGART, OF SCHRAALENBURG, NEW JERSEY, AND MICHAEL B. LEONARD, OF RICHMOND, VIRGINIA, ASSIGNORS TO THE ELECTRIC SELECTOR AND SIGNAL COMPANY, OF WEST VIRGINIA.

## ELECTRICAL APPARATUS FOR CONTROLLING SIGNALS.

SPECIFICATION forming part of Letters Patent No. 529,059, dated November 13, 1894.

Application filed December 11, 1893. Serial No. 493,329. (No model.)

*To all whom it may concern:*

Be it known that we, SAMUEL S. BOGART, residing at Schraalenburg, in the county of Bergen and State of New Jersey, and MICHAEL B. LEONARD, residing at Richmond, in the county of Henrico and State of Virginia, citizens of the United States, have invented certain new and useful Improvements in Electrical Apparatus for Controlling Signals; and we 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.

Our invention relate to improvements in interlocking block signaling apparatus adapted especially for use in controlling semaphore or other visual signals.

Primarily the object of the invention is to provide signaling devices at each station connected by a main line which is adapted for use for both telegraphing and signaling purposes.

A further object of the invention is to provide simple and efficient means for locking the signals directly instead of locking them through intermediate controlling devices as has been done heretofore.

The invention consists in the features of construction and combinations of devices hereinafter fully described and clearly defined in the appended claims.

Referring to the accompanying drawings, forming a part of this specification, Figure 1 is a diagrammatical representation of an interlocking block signaling system between two block offices or stations, embodying our invention, the parts being in normal position for telegraphing. Fig. 2 is a similar view showing one of the switches pulled down to release the signal at the distant station. Fig. 3 is a diagram of a modification in which the circuit of the unlocking magnet is extended to include a signal lever; and Fig. 4 illustrates a further modification.

A and B indicate two block stations, connected by a main line wire C, provided at each station with a Morse relay D, sounder E, and key F, the key having three instead of two points.

*a* and *b*, indicate semaphore signals located respectively at the stations A and B. These semaphores, as will be observed, are unprovided with the usual signal levers, and are designed to drop by gravity after being released by the electrical means hereinafter described, and to be returned to their normal or locked position by hand through suitable pull-cords G. Each of the signals *a* and *b*, is provided with a lug or catch H, at its pivoted end adapted to be engaged by an armature pawl I, pivotally supported adjacent to a magnet K, to be attracted thereby when the latter is energized. Each of the magnets K, is included in a local battery circuit comprising a battery *x*, wires *x'*, and a polarized relay $x^2$. Each terminal of the main line C, is provided with a circuit closer *c*, and with a spring switch L, which serves when in normal position (as shown in Fig. 1) to ground the main line through the battery M. B. for telegraphing. These switches each consist of a pull rod *l*, provided at its upper end with a spring *l'*, and at about equidistant points throughout its length with cross arms $l^2$, $l^3$, and $l^4$, serving as contact points. The points $1^2$ and $1^3$, are connected with the terminals of the main line battery, M. B. while the point $l^3$, is connected with the ground wire *m*, and the point $l^4$, with the ground wire $m^1$. The polarized relay circuit is normally grounded through the spring switch and wire *m'*.

The operation of the mechanism will now be described.

As shown in Fig. 1 the parts are in position for telegraphing, the circuit being traced as follows by reference numerals:—From the ground wire *m*, through $l^3$ to the main battery, thence through arm $l^2$, and conductor 4, to key F, the depression of the key passes the current to the main line C, thence through the telegraph relay D, at station B, and thence through conductors 6, 7, 8, 9, 10 and *m'*, to ground. It will be understood that the current thus used for telegraphic purposes will not affect the polarized relay at B, (and consequently will not release B's signal) inasmuch as said relay is adjusted to respond only to a reversed current from A's battery,

or to a change in polarity of said battery. To release the signal at B, the operator at A pulls down the switch L, to the position shown in Fig. 2. This results in breaking the ground connection of A's relay circuit at the point 11, and throws the relay into the main battery circuit, so that the current will pass through the following circuit from ground wire *m* through 12 and 13 to the battery, through 14, 15 and 16, to the main line and through 17 to B's relay and thence through 18, 19 and 20 to ground. The electro-magnet at B is thus energized and the armature pawl withdrawn to release the signal. It will be observed that in the circuit last traced the current is of opposite polarity from that used for telegraphing, and the relay at B is adjusted to respond only to such reversed current. The switch L at station A is automatically retracted when released by the spring $2^{\times}$ to return the connections to their normal position. The signal at A is operated from station B in like manner, the connections and construction being similar to those at the station A.

In Fig. 3 we have shown an extension of the polarized relay's local circuit to include a signal lever N, provided with a lug *n*, adapted to be engaged by a pawl *n'*. This lever N is connected by pull-wires *o*, and a bell-crank lever *p*, with the semaphore. This modified construction is designed for use only where the semaphores are provided with operating levers, and it is not intended to lock both the signal and the signal lever at the same time.

It will be understood that the operation in the modification is substantially similar to that above described, the difference being that in the one case the semaphore is directly locked, while in the other the locking pawl engages the operating lever. It may also be desirable in some cases to use a locking bar P (Fig. 4) connected to the semaphore by a pivoted rod *p*, and an intermediate bell-crank *p'*, and having a notch $p^2$, for engagement by the armature pawl; the semaphore being connected on the opposite side of its pivot with a rod $p^3$, connecting by intermediate bell-crank $p^4$, and rod $p^5$, with the operating lever $p^6$.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. A railway signaling system comprising a main line connecting two or more stations, a main battery at each station, a local signal-circuit at each station electrically connected with said main line and including a polarized relay adapted to respond to a current of one polarity only, electrical connections adapted when in normal position to ground the terminals of the main line through the batteries at the respective stations, and also to connect the relay at each station directly but independently to ground, so as to adapt the apparatus to be used for telegraphing without affecting the relays; and a reversing switch for throwing the battery at either station into circuit with the relay at the distant station so as to cause a current of an opposite polarity from that used for telegraphing to pass over the line to the distant station and release the distant signal, substantially as described.

2. A railway signaling system comprising a main line connecting two or more stations, a local signal-circuit at each station electrically connected with said main line and including a normally grounded polarized relay adapted to respond to a current of one polarity only passing over the line from the battery at the distant station, electrical devices and connections at each station adapted when in normal position to connect the terminals of the main line to ground through the battery and permit telegraphing without affecting the relay; said devices including a reversing switch adapted to shift the ground connections of the main line terminals so as to throw the battery at the approximate station into circuit with the relay at the distant station and cause a current of an opposite polarity to that used for telegraphing to pass over the line to the distant relay and thereby release the distant signal, substantially as described.

3. In a signaling system, the combination with the main line connecting two or more stations, of a main battery at each station, a local circuit at each station electrically connected with said main line and including a polarized relay, the latter being normally electrically connected to ground, an independent ground terminal normally connected with said main line through said battery, and devices for telegraphing with the parts in normal position without affecting the relays, together with a reversing switch interposed between said ground terminals and main line connections adapted to reverse the current through the battery and place the latter in circuit with the relay at the distant station, so as to cause a current of an opposite polarity from that used for telegraphing to pass over the line to the distant station so as to energize the relay at the latter station and release the signal, substantially as described.

4. In a railway signaling system, the combination with the main line connecting two or more stations and a telegraphic apparatus, of a local circuit at each station including a polarized relay, a main battery, independent ground terminals adapted to be alternately thrown into electrical connection with opposite poles of said battery for the purpose of reversing the current through the latter, and a reversing switch, whereby a current of one polarity may be used for telegraphing without affecting the signals, while the signal at the distant station may be unlocked by a change of polarity or reversal of the current from the battery at the proximate station, substantially as described.

5. In a signaling apparatus, the combination with the main line and its keys, of the visual signals, their locking armatures and local circuit devices, and a switch at each station comprising a depending rod provided with a retracting spring and with cross-arms constituting contact points, substantially as described.

6. A system of signaling between two or more stations, comprising at each station a telegraphic apparatus, a main battery, a polarized relay and circuit connections including an electrical unlocking device adapted to respond to a current of one polarity only passing from the battery at the distant station, and a reversing switch for shifting the circuit connections to adapt the mechanism for telegraphing by reversing the current through the battery, substantially as described.

7. A system of signaling between two or more stations, comprising at each station a visual signal and an electrically controlled locking device adapted to contact or engage directly with said signal, together with a main line and local circuit connections and appliances including an unlocking magnet, a main battery, a polarized relay adapted to respond to a current passing from the distant station only, and a reversing switch, whereby the mechanism is adapted for both telegraphing and signaling by alternately reversing the current through the battery, substantially as described.

8. In a railway signaling apparatus, the combination with a main line connecting two or more stations, of a lock-signal, a telegraphic apparatus, a main battery and independent ground terminals at each station, one of said terminals connecting one pole of said battery to said main line for telegraphing, and means for shifting the circuit connections so as to reverse the current through said battery and cause a current of an opposite polarity to pass over the line from the proximate to the distant station, together with electrical devices adapted to respond to said reversed current only and unlock the distant signal, substantially as described.

9. A system of signaling between two or more stations, comprising at each station a visual signal and an electrically controlled locking device for said signal, together with a main line and local circuit connections and appliances including an unlocking magnet, main battery, a polarized relay adapted to respond to a current passing from the distant station only, and means located at each station whereby the mechanism is adapted for both telegraphing and signaling over a single wire by alternately reversing the current through the battery, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

SAMUEL S. BOGART.
MICHAEL B. LEONARD.

Witnesses:
WILLIAM SUTPHEN,
WM. C. COX.