

No. 642,362.

M. PFATISCHER.

Patented Jan. 30, 1900.

SIGNAL.

(Application filed Oct. 30, 1899.)

(No Model.)

2 Sheets—Sheet 1

FIG. 1.

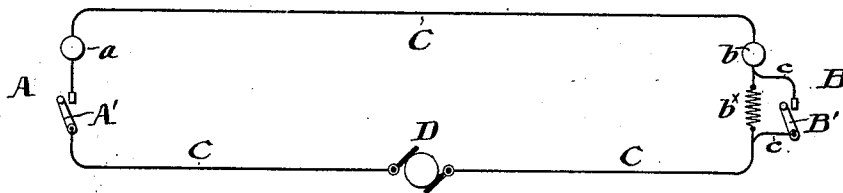


FIG. 2.

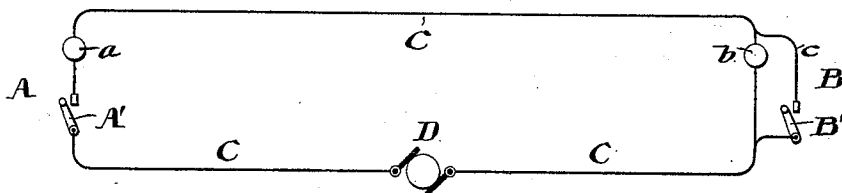


FIG. 3.

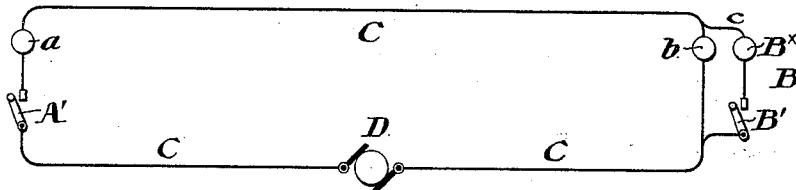


FIG. 4.

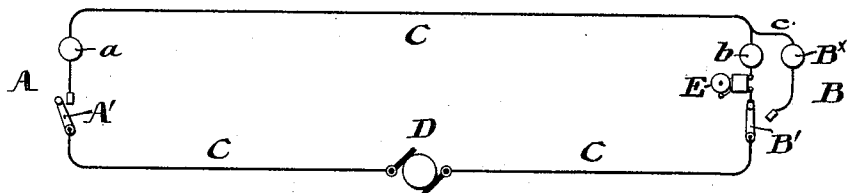
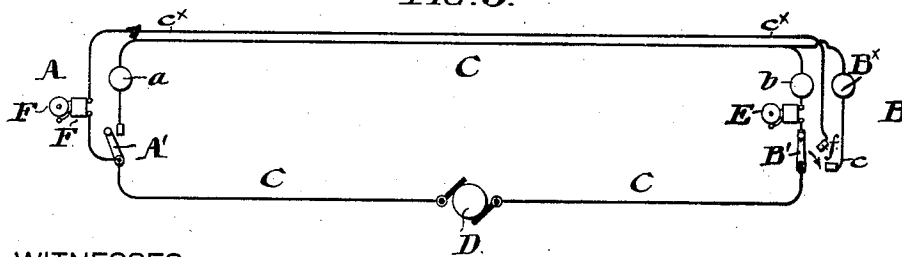


FIG. 5.



WITNESSES:

Clifton C. Hallowell
E. L. Fullerton.

INVENTOR:

MATHIAS PFATISCHER
by Arthur E. Paige
Atty.

No. 642,362.

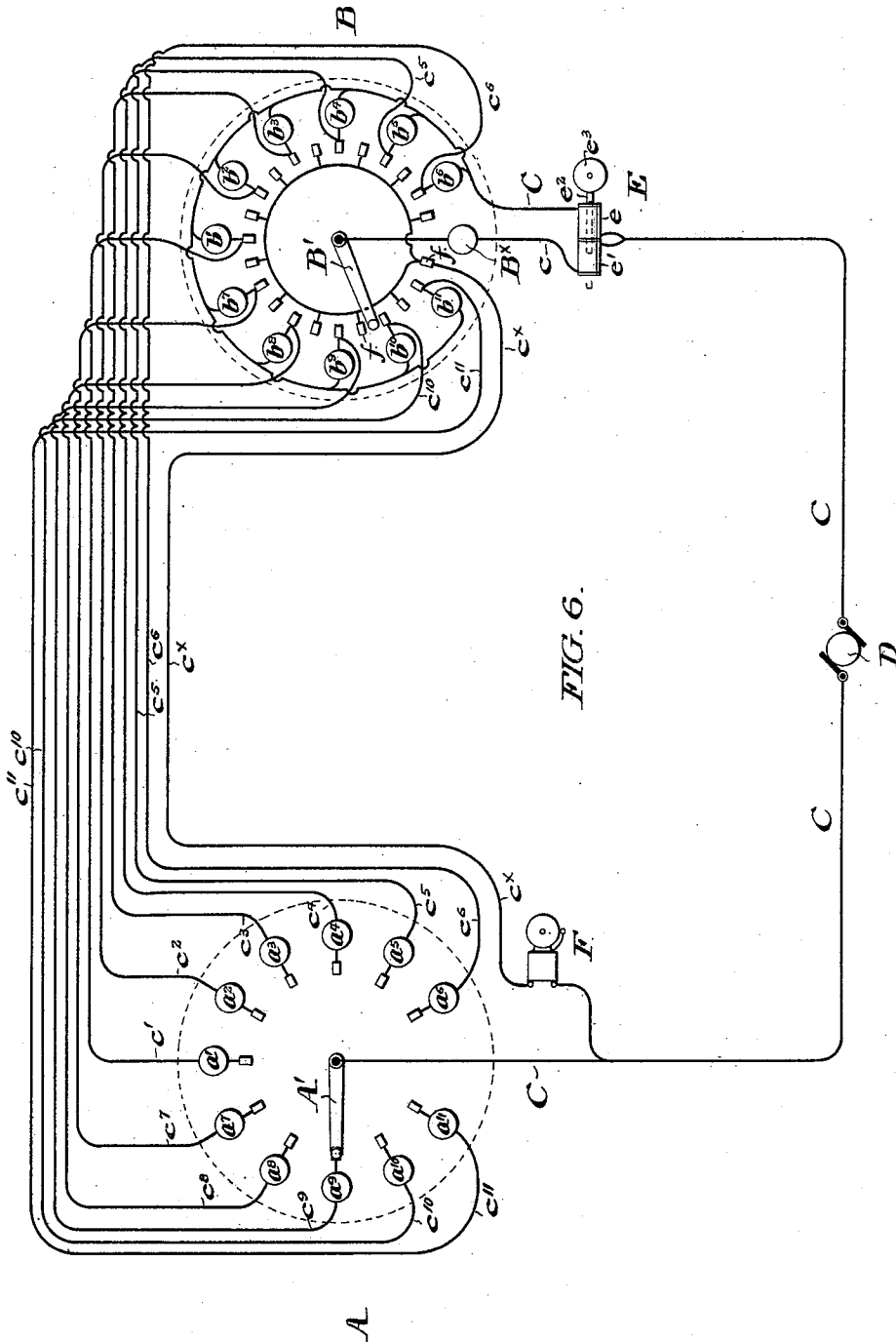
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2 Sheets—Sheet 2



WITNESSES:

Clifton C. Halliwell
E. L. Fullerton

INVENTOR:

MATHIAS PFATISCHER

By Arthur E. Paige
Att'y.

UNITED STATES PATENT OFFICE.

MATHIAS PFATISCHER, OF PHILADELPHIA, PENNSYLVANIA.

SIGNAL.

SPECIFICATION forming part of Letters Patent No. 642,362, dated January 30, 1900.

Application filed October 30, 1899. Serial No. 736,175. (No model.)

To all whom it may concern:

Be it known that I, MATHIAS PFATISCHER, of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Signals, whereof the following is a specification, reference being had to the accompanying drawings.

My invention relates to an arrangement of conductors, switches, &c., whereby signals may be transmitted electrically and manifested by the illumination of an electric lamp or lamps.

It is the object of my invention to provide simple and efficient means for signaling between distant stations under circumstances where it is necessary or desirable that an acknowledgment of the correct receipt of a given signal may be immediately returned to the initial end of the line. Such conditions exist upon naval vessels, where the commanding officer must be immediately apprised whether his orders transmitted to the engine-room are or are not understood. I have therefore shown and herein described a form of my invention arranged for the transmission of the customary signals between the bridge and the engine-room upon shipboard. However, it is to be understood that my improvements are not limited to such an embodiment.

In the accompanying drawings, Figures 1, 2, and 3 respectively show modified embodiments of my invention in simple form arranged to manifest signals solely by the illumination of lamps. Figs. 4 and 5 show modified embodiments of my invention, including audible sounding devices. Fig. 6 is a diagram showing a convenient arrangement of my invention adapted to manifest a plurality of signals.

Although, as above indicated, my invention is designed to transmit and return signals in alternation between opposite stations in a line-circuit, for convenience of description I shall hereinafter term the station at which the signals originate the "transmitting-station" and the other the "receiving-station."

Referring to Fig. 1, A is the transmitting-station, and B the receiving-station, connected by the line-circuit C, which includes a generator or other source of current D. The

transmitting-station A comprises a signal-lamp *a* and switch A', and the receiving-station B comprises a signal-lamp *b* and resistance b^x in the line-circuit. The conductor *c* connects with the line C at the opposite sides of the resistance b^x and includes a switch B', whereby the current in the line may be modified by the establishment of a shunt-circuit through *c* around said resistance b^x . The arrangement of the parts just described is such that closure of the switch A' at the transmitting-station A establishes a current through the lamp *a* thereat and the lamp *b* at the receiving-station B. It being then desired to return a signal from the receiving to the transmitting station, the switch B' is closed, and the current existing through the lamps *a* and *b* is accordingly modified by the short circuit established around the resistance b^x , and such modification of the current being manifested in the altered illumination of the signal-lamp *a* the operator at station A is apprised that his signal has been received at B.

In the form of my invention shown in Fig. 2 the shunt-conductor *c* connects with the line C upon opposite sides of the lamp *b*, the resistance-coil b^x being omitted. The signal-lamp *b* serves as the resistance, which is short-circuited by the closure of the switch B'. The current existing through the signal-lamps being modified by the movement of said switch, a difference in the illumination is of course manifested, as aforesaid.

In the form of my invention shown in Fig. 3 the shunt-circuit *c* connects with the line C upon opposite sides of the lamp *b* and includes a lamp B^x . In order to secure the maximum manifestation of the signals in this form of my invention, I prefer to have the lamp *b* of greater resistance than the lamp *a* or the lamp B^x . For instance, *a* may equal fifty volts, *b* one hundred volts, and B^x fifty volts. By such an arrangement the lamp *b* may be illuminated by closure of the switch A' without the illumination of the lamp *a*, the coarser filament of the latter permitting the flow of current without apparent incandescence. When, however, the switch B' is closed at the receiving-station, the lamp *b* is bridge-circuited and dimmed, and both of the lamps *a* and B^x are illuminated by the consequent

modification of the current existing in the circuit C.

In the form of my invention shown in Fig. 4 the line-circuit C at the receiving-station B includes not only the lamp b , but also a sounding device E, such as a bell, and closure of the switch A' at station A suffices to illuminate said lamp b and operate the sounding device E. When, however, the switch B' is turned to connect with the shunt c , the lamp b is extinguished, the operation of the sounding device E terminated, and both the lamps B^x and a at the respective stations illuminated.

In the form of my invention shown in Fig. 5 one side of the circuit C comprises an additional parallel conductor c^x , which includes a sounding device F, such as a bell, at the transmitting-station A, and the terminal f of said conductor c^x is so disposed at the receiving-station B that the switch B' contacts therewith in its traverse to contact with the terminal of the shunt c .

With the form of my invention shown in Fig. 5 the current established in the circuit C by the closure of the switch A' at the station A illuminates the lamp b and operates the sounding device E at the receiving-station B, and movement of the switch B' in the direction of the arrow shunts said current temporarily through the sounding device F at the transmitting-station A, and further movement of said switch B' to contact with the terminal of the shunt-circuit c disconnects the circuit c^x , terminates the operation of the sounding device F, and illuminates the lamps B^x and a . A visible and audible signal is therefore given at the station B by the closure of the switch A' at the transmitting-station, and a visible and audible signal is given in return at the transmitting-station by the closure of the switch B' at the receiving-station.

It is to be understood that although I have shown and described various forms of my invention as comprising single lamps at the transmitting and receiving stations respective groups of lamps, comprising any desired number, may be located at the transmitting and receiving stations, the corresponding lamps of the groups being connected by distinct conductors arranged in parallel upon one side of the line-circuit C, whose opposite side may consist of a single common conductor. For instance, the form of my invention shown in Fig. 5 may be arranged to manifest a plurality of signals, as shown in Fig. 6, wherein the transmitting and receiving stations A and B comprise corresponding groups of eleven lamps a' to a^{11} and b' to b^{11} , respectively.

The arrangement shown in Fig. 6 is peculiarly adapted for signaling upon shipboard, the transmitting-station A being located at the bridge and the receiving-station B in the engine-room. The lamps of the respective transmitting and receiving groups being ar-

ranged in circular arcs, as shown, the corresponding lamps a' and b' , centrally located at the top of their respective groups, serve to indicate the signal "stop," and the lamps immediately to the right and left thereof indicate the signal "stand by" or "attention," the lamps to the right and to the left thereof indicating, respectively, the signals for going ahead and going astern with increasing speed in accordance with their distance from the central lamps a' and b' , the next lamp to that, meaning attention, indicating "dead-slow speed" and the others "slow speed," "half-speed," and "full speed," respectively. I have shown in Fig. 6 the sounding device F at the transmitting-station connected by the parallel conductor c^x with the terminals f at the receiving-station. The sounding device F' at the receiving-station B comprises two differential coils, the coil e being included in the line-circuit C and the coil e' being included in the shunt-circuit c . Said coils are alined and provided with a reciprocatory core e^2 , arranged to strike upon the gong e^3 , and the operation of the apparatus is as follows: It being desired to signal from the bridge-station A to the engine-room station B to go astern at slow speed, the switch-lever A' is set in registry with the lamp a^9 upon the left-hand side of the transmitting group, and the lamps in the system being of different resistance, as above described, the lamp a^9 remains substantially unilluminated by the current established through it, but the corresponding lamp b^9 in the group at station B is illuminated. Simultaneously with the illumination of said lamp b^9 the coil e is energized and the core e^2 shifted to the position shown in said Fig. 6, thus sounding the gong e^3 . In order to return a signal to the bridge-station A in acknowledgment of the correct receipt of the foregoing signal, it is necessary to shift the switch-lever B' to register with the energized lamp b^9 , and the lever B' in passing contacts with one of the terminals f of the conductor c^x and through the latter actuates the sounding device F at the station A. Further movement of said lever B' to register with the lamp b^9 breaks the circuit through said conductor c^x and establishes a circuit around the lamp b^9 through the shunt c , with the effect that said lamp b^9 is dimmed and the lamps B^x a^9 illuminated. The current sent through the coil e' in the shunt c in giving the return signal serves to return the core e^2 to its normal position away from the gong e^3 .

Of course the operator at station A may place the switch-lever A' in registry with any one of the lamps a' to a^{11} with a resulting operation similar to that above described. It is to be noted, however, that no return signal can be given by the operator at the receiving-station unless the switch B' is placed in registry with the particular lamp of the series b' to b^{11} , by which the initial signal has been manifested. Therefore the greatest ac-

curacy in the exchange of signals results from the fact that the operator at the receiving-station not only receives an audible signal, calling his attention to the visible manifestation at the indicating instrument, but his attention must be further concentrated upon the particular signal in placing the switch B' in registry therewith to effect said return signal, and of course if the transmitting operator does not receive the return signal at station A it is evident that some mistake has occurred, and the desired signal may be again transmitted.

Although I find it convenient, as aforesaid, to provide a sounding device by which the attention of the operator may be attracted to the signal-lamps, it is to be noted that the sounding device is not an essential element of my invention, which in its simpler form consists of the corresponding lamps at the respective stations and the means for modifying the current therethrough, as hereinbefore more particularly described. Moreover, although it is a desirable refinement of the apparatus to employ corresponding lamps of respectively different voltage at the transmitting and receiving stations, and thus secure the maximum variation of illumination, as above described, it is to be understood that this feature is not essential to the operation of my invention.

Various modifications may be made in the precise details of construction and arrangement of the various parts of my invention without departing from the spirit thereof, and therefore I do not desire to limit myself to the precise form or arrangement which I have shown and described.

I claim—

1. In an electric signaling device, the combination with a line-circuit including a source of current and transmitting and receiving stations, of a lamp at the transmitting-station, a lamp at the receiving-station, means at the transmitting-station arranged to establish a current through both lamps, and manifest a signal at the receiving-station, by the illumination of the lamp thereat, a normally-open shunt-circuit arranged to bridge resistance, in the line-circuit, at the receiving-station, and means at the receiving-station, arranged to close said shunt-circuit; thereby modify the current established in the line-circuit, and manifest a return signal at the transmitting-station, by the illumination of the lamp thereat, substantially as set forth.

2. In an electric signaling device, the combination with a line-circuit including a source of current and transmitting and receiving stations, of two lamps located respectively at said stations and differing in voltage, means at the transmitting-station arranged to establish a current through both lamps, and manifest a signal at the receiving-station, by the illumination of the lamp thereat, a normally-open shunt-circuit arranged to bridge resist-

ance, in the line-circuit, at the receiving-station, and means, at the receiving-station, arranged to close said shunt-circuit; thereby modify the current established in the line-circuit, and manifest a return signal at the transmitting-station, by the illumination of the lamp thereat, substantially as set forth.

3. In an electric signaling device, the combination with a line-circuit including a source of current and transmitting and receiving stations, of a lamp at the transmitting-station, a lamp at the receiving-station, means at the transmitting-station arranged to establish a current through both lamps, and manifest a signal at the receiving-station, by the illumination of the lamp thereat, a normally-open shunt-circuit arranged to bridge said lamp, in the line-circuit, at the receiving-station, and means, at the receiving-station, arranged to close said shunt-circuit; thereby modify the current established in the line-circuit, and manifest a return signal at the transmitting-station, by the illumination of the lamp thereat, substantially as set forth.

4. In an electric signaling device, the combination with a line-circuit including a source of current, and transmitting and receiving stations, of a lamp in the line-circuit at the transmitting-station; a lamp in the line-circuit at the receiving-station, a normally-open shunt-circuit arranged to bridge resistance, in the line-circuit, at the receiving-station, a second lamp at the receiving-station, in said shunt-circuit, means, at the transmitting-station, arranged to establish a current through both lamps in the line-circuit and manifest a signal at the receiving-station, by the illumination of the lamp thereat, and means, at the receiving-station, arranged to close said shunt-circuit; thereby modify the current established in the line-circuit, manifest a return signal at the transmitting-station by the illumination of the lamp thereat, and illuminate the lamp in said shunt-circuit at the receiving-station, substantially as set forth.

5. In an electric signaling device, the combination with a line-circuit including a source of current and transmitting and receiving stations, of a lamp at the transmitting-station, a lamp at the receiving-station, a sounding device at the receiving-station, means, at the transmitting-station, arranged to establish a current through both lamps and manifest a signal at the receiving-station, by the illumination of the lamp and the operation of the sounding device thereat, a normally-open shunt-circuit arranged to bridge resistance, in the line-circuit, at the receiving-station, and means, at the receiving-station, arranged to close said shunt-circuit; thereby modify the current established in the line-circuit, and manifest a return signal at the transmitting-station, by the illumination of the lamp thereat, substantially as set forth.

6. In an electric signaling device, the combination with a line-circuit including a source

of current and transmitting and receiving stations, of corresponding groups of lamps at the respective stations, means, at the transmitting-station, arranged to establish a current, selectively, through any one of the groups thereat and the corresponding lamp of the group at the receiving-station, a normally-open shunt-circuit, arranged to bridge the energized lamp, at the receiving-station, and means, at the receiving-station, arranged to close said shunt-circuit; thereby modify the current established in the line-circuit, and manifest a return signal at the transmitting-station, by the illumination of the selected lamp thereat, substantially as set forth.

7. In an electric signaling device, the combination with a line-circuit, including a source of current and transmitting and receiving stations, of corresponding groups of lamps at the respective stations, a sounding device at the receiving-station, means, at the transmitting-station, arranged to establish a current, selectively, through any lamp of the group thereat and the corresponding lamp of the group at the receiving-station, and operate said sounding device, a normally-open shunt-circuit arranged to bridge the energized lamp at the receiving-station, and means, at the receiving-station, arranged to close said shunt-circuit; thereby modify the current established in the line-circuit, and manifest a return signal at the transmitting-station by the illumination of a lamp thereat, substantially as set forth.

8. In an electric signaling device, the combination with a line-circuit including a source of current and transmitting and receiving stations, of corresponding groups of lamps at the respective stations, a sounding device at the transmitting-station, means, at the transmitting-station, arranged to establish a current, selectively, through any lamp of the group thereat and the corresponding lamp of the group at the receiving-station, a normally-open shunt-circuit arranged to bridge the energized lamp at the receiving-station, and cooperative means, at the receiving-station, arranged to operate said sounding device, and close said shunt-circuit; thereby modify the current established in the line-circuit, and manifest a return signal at the transmitting-station by the illumination of the selected lamp thereat, substantially as set forth.

9. In an electric signaling device, the combination with transmitting and receiving stations, of a line-circuit extending between said stations and comprising a series of conductors in parallel relation upon one side, and a common conductor upon the other side, a source of current in said circuit, corresponding groups of lamps at the respective stations, the corresponding lamps of the respective groups being connected in series relation by said respective parallel conductors, means at the transmitting-station to selectively establish a current through any one of said series

of parallel conductors, and the corresponding lamps connected therewith, and means at the receiving-station to bridge-circuit the energized lamp thereat and thereby increase the illumination of the lamp energized at the transmitting-station, substantially as set forth.

10. In an electric signaling device, the combination with transmitting and receiving stations, of a line-circuit extending between said stations and comprising a series of conductors in parallel relation upon one side, and a common conductor upon the other side, a source of current in said circuit, corresponding groups of lamps at the respective stations, the corresponding lamps of the respective groups being connected in series relation by said respective parallel conductors, a sounding device at the receiving-station, means at the transmitting-station to selectively establish a current through any one of said series of parallel conductors, the corresponding lamps connected therewith, and, the afore-said sounding device, and means at the receiving-station to bridge-circuit the energized lamp thereat, thereby increase the illumination of the lamp energized at the transmitting-station, and simultaneously terminate the operation of the sounding device, substantially as set forth.

11. In an electric signaling device, the combination with a line-circuit including a source of current and transmitting and receiving stations, of corresponding groups of lamps at the respective stations, sounding devices at the respective stations, means, at the transmitting-station, arranged to establish a current, selectively, through corresponding lamps of the respective groups, and operate the sounding device at the receiving-station, a normally-open shunt-circuit arranged to bridge the energized lamp at the receiving-station, and cooperate means, at the receiving-station, arranged to operate the sounding device at the transmitting-station, and close said shunt-circuit; thereby modify the current established in the line-circuit, and manifest a return signal at the transmitting-station by the illumination of the selected lamp thereat, substantially as set forth.

12. In an electric signaling device, the combination with transmitting and receiving stations, of a line-circuit extending between said stations; comprising a series of conductors in parallel relation upon one side and a common conductor upon the other side, a source of current in said circuit, corresponding groups of lamps at the respective stations; corresponding lamps of the respective groups being connected in series relation by said respective parallel conductors, sounding devices at the respective stations, means, at the transmitting-station, arranged to establish a current, selectively, through one of the parallel conductors of said series, and the corresponding lamps connected there-

with, and to operate the sounding device at the receiving-station, a normally-open shunt-circuit arranged to bridge the energized lamp at the receiving-station, a lamp in said shunt-circuit, and coöperate means, at the receiving-station, arranged to operate said sounding device at the transmitting-station, and to close said shunt-circuit; thereby modify the current established in the line-circuit and

illuminate the lamp in the shunt-circuit at the receiving-station, and the selected lamp at the transmitting-station, substantially as set forth.

MATHIAS PFATISCHER.

Witnesses:

HENRY N. CONARD,
ARTHUR E. PAIGE.