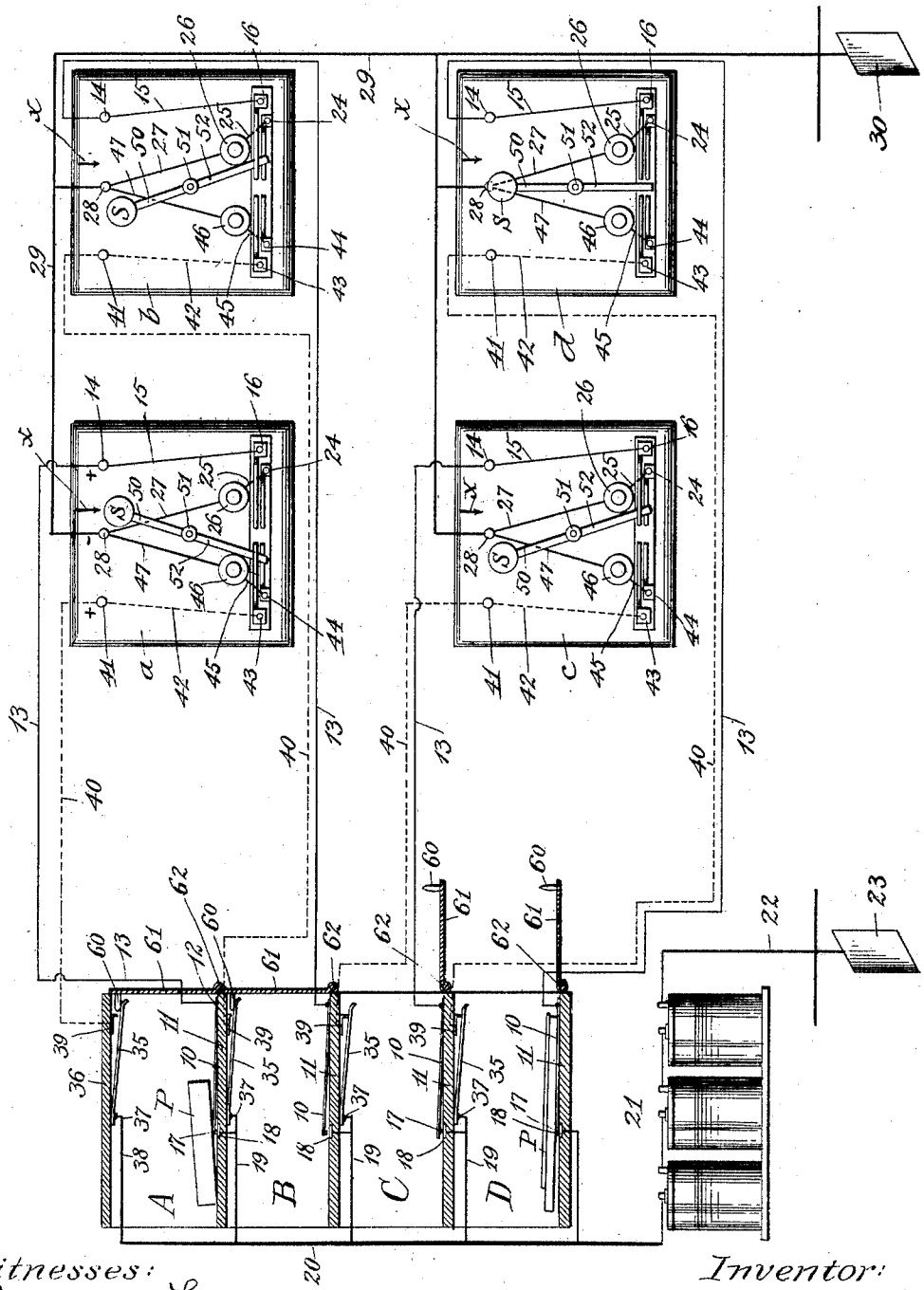
No. 759,047. PATENTED MAY 3, 1904.

G. L. VANNAIS.

ELECTRIC SIGNAL SYSTEM.

APPLICATION FILED JUNE 20, 1903.

NO MODEL.



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UNITED STATES PATENT OFFICE.

GEORGE L. VANNAIS, OF HARTFORD, CONNECTICUT.

ELECTRIC SIGNAL SYSTEM.

SPECIFICATION forming part of Letters Patent No. 759,047, dated May 3, 1904.

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To all whom it may concern:

Be it known that I, GEORGE L. VANNAIS, a citizen of the United States, and a resident of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Electric Signal Systems, of which the following is a full, clear, and exact specification.

My invention relates to electric signal systems; and it has for one of its objects the provision of such a system in which the signal after it has responded to its actuating-current will become effective in opening said circuit, so as to avoid waste of electric energy.

My invention has, furthermore, for its object the provision of a signal system in which a pair of independent circuits are employed in actuating the signal in opposite directions, so as to set the same for indicating one fact, while the other circuit will reverse the signal to indicate another fact.

My invention has, furthermore, for its object the combination, with such a signal system, of a receptacle having a door for removing its contents and a pair of independent circuit-closers, one of which is adapted to be operated by any article deposited in said receptacle, while the other is operable by opening the door thereof.

Further objects of the invention may be found in the organization of some of the elements of my improved system.

It should be stated at this time that my invention may be carried into practice in many different ways, and in the drawings I have illustrated my improved system in connection with mail-boxes the signals for which indicate the conditions prevailing in each box—viz., the deposit of any mail-matter therein, its removal therefrom, and also the condition of the door—it being of course understood that while the mail-receptacles may be located at one point—as, for instance, the post-office—the signals for the several boxes will be located in the residences or offices of the parties to whom the signals are of importance.

Primarily it is the object of my invention to obviate many annoyances now existing in connection with the delivery of mail-matter, be it in city or country. The hours for the arrival and distribution of mail-matter are data which those especially interested in its prompt reception are generally aware of, and experience has demonstrated that trips to the post-office are frequently useless, thus proving a waste of time and during inclement weather a matter of regret.

My improved system will indicate clearly whether any mail-matter is awaiting. It will show when the door of the mail-box is open, either inadvertently or for the removal of its contents, and it will also give information whether mail has been left in the box. Briefly, it will indicate the proper and improper conditions of the box.

Referring to the drawings, in which similar characters denote similar parts, A denotes a receptacle for mail, and a number of such boxes have been shown to illustrate that the system may be used in connection with the post-office or similar institution with equal facility. Inasmuch as all of the boxes in the series contain elements of similar nature, the description of one set will be considered sufficient for all, and this same fact will also relate to the signals belonging to the several boxes, respectively.

Disposed within the box A may be a tray 10, shown as a resilient plate secured to the bottom-plate 11 of the box, as shown at 12, and connected at this point with a conductor 13, leading to a binding-post 14 on the signal-board *a*, which in turn is in electric communication, through conductor 15, with a contact 16, so that in this manner a direct connection exists between the point 12 and the contact 16.

The front end of the tray 10 is in the present instance provided with a contact-point 17, adapted to establish electrical communication with the plate or contact-point 18, disposed on the bottom 11 of the box A and connected, through a conductor 19, with a wire 20, which constitutes the return-line of all the tray-circuits for the several boxes and which leads to a battery or other source of electrical energy 21, the latter being grounded through a conductor 22 and as shown at 23.

Coöperative with the contact 16, above mentioned, is a contact member 24, from which a conductor 25 leads to a magnet 26, the other

end of said magnet being connected, through a wire 27, with the binding-post 28, held on the signal-board *a*, which, through a conductor 29, is grounded, as shown at 30.

From the above description it will be seen that when the points 17 and 18 are in contact with each other and when, furthermore, the contacts 16 and 24 are electrically connected an electric current will be established through the battery 21, through conductors 20, 19, 13, 15, 27, and 29, and also the grounding-plates 30 and 23, thus energizing the magnet 26 and setting the signal S as represented on the base-board *a* in a manner which will hereinafter be described. Also disposed in the box A may be a spring 35, secured to the under side of the top board 36 of said box, as shown at 37, at which point said spring 35 is electrically connected, through a conductor 38, with the return-wire 20, above mentioned. The spring 35 is one member of a circuit-maker, the other member, 39, of which is also secured to the top board 36 and is in communication, through a conductor 40, with a binding-post 41, electrically connected, through a conductor 42, with one member, 43, of a circuit-breaker secured upon the base-board *a*, while the other member, 44, thereof is connected, through a conductor 45, with a magnet 46, also connected, through a wire 47, with the binding-post 28 above mentioned.

From the above description it will be seen that there are a pair of distinct and independent circuits leading from the receptacle A to the magnets 26 and 46, respectively, the energization of which will result in setting the signal to indicate certain facts.

The signal S consists, substantially, of a target mounted upon an arm 50, which is mounted for oscillation on a pivot 51 and the extension 52 of which is preferably less in weight than that of the arm 50, so that when the base-board *a* is placed vertically and in the manner shown in the drawings any tendency of the arm 50 assuming a vertical position will be avoided by virtue of its center of gravity being disposed above the supporting-pivot 51, so that the signal-arm 50 will remain either on one side or on the other of said pivot and until forcibly reversed.

The ordinary or normal position of the signal S is clearly shown on the base-board *b*, the several elements of which are connected with the receptacle B in the same manner as the elements of the board *a* are connected with the receptacle A, and it may be stated at this time that the same system is carried out between the receptacle C and the base-board *c*, as well as between the receptacle *d* and the base-board D, respectively.

In the drawings the receptacle B is shown empty, so that the contact-points 17 and 18 are separated, while at the same time contact between the spring 35 and contact 39 is prevented by a projection 60, secured to or forming a part of a door 61, whereby the front of said receptacle B may be closed and which may be pivoted at 62 to be opened, and thus permit the contact 39 and spring 35 to establish or make a circuit at that point for a magnet 46 on the base-board *b*.

In the present instance the signal-arm 52 is a permanent magnet, a circumstance which is highly advantageous in connection with my system, inasmuch as it permits a powerful push to be exerted on said arm whenever either of the magnets 26 or 46 are energized to repel instead of attract said bar 52, the repelling force becoming, of course, less as the distance between the bar and the repelling-magnet increases.

Inasmuch as it is evident that when a package or other article is placed on the tray 10—as, for instance, shown in the box A—the magnets 26 will become energized and as a natural result remain so until said package P is removed from the tray 10. Means are provided whereby the energizing-circuit for magnet 26 is automatically broken as soon as the signal has been reversed or the bar 52 has been repelled from the magnet 26, so that in this manner all waste of electric energy will be obviated. The means for accomplishing this break in the circuit for the magnet 26 comprise in the present instance the circuit-breakers 16 and 24, above mentioned, the blades of which are preferably disposed at a distance from each other equal to the thickness of the bar 52 and are resilient in nature, so that when the signal is set as shown on the base-board *b* the bar 52 will be in contact with both the contact-breakers 16 and 24 and will therefore establish or make the circuit for the magnet 26 complete at that point, while of course it will be understood that this magnet will not be energized until a package will be placed on the tray 10 or the latter will be depressed so as to bring the contact-points 17 and 18 together.

From the foregoing it is evident that the receptacle B and its signal are in normal conditions, the signal now indicating that the box is empty. When, however, the tray 10 is depressed to connect the contact-points 17 and 18, as shown in box A, the magnet 26 will immediately become energized, thus repelling the arm 52 and setting the signal as shown on the base-board *a*, in which position the arm 52 will now serve as a circuit-maker for the magnet 46 by virtue of its contact with both of the circuit-breakers 23 and 44, which are elements in said circuit, the latter having also the contact 39 and the spring 35, whereby the circuit for the magnets 46 is established as soon as the door 61 has been opened sufficiently to permit said points to contact with each other. This condition is clearly illustrated in connection with the box D, in which not only the tray 10 is held down to bring the points 17 and 18 together, but in which also

the door 61 is open, permitting the point 39 and spring 35 to contact, so that in this instance the circuits for both magnets 26 and 46 are made. The signal S will consequently have a vibratory motion between said magnets, for the reason that as soon as the arm 52 of the signal forms an electric connection between the contact-breakers and 16 and 24 or 43 and 44, respectively, the magnet in that particular circuit will become energized, thus reversing the signal and throwing it over again on the other side, this procedure being continued until either the tray 10 is permitted to separate the contact-points 17 and 18 or else the door is closed to separate the contact 39 and spring 35.

Although the fact that a permanent magnet will be repelled by an electromagnet whenever an electric current is sent through the latter, as is well known, I consider it a necessary attribute in the form of operation of my system, for the following reason: The repelling force exerted by the electromagnet is greater in efficiency the nearer the permanent magnet is to the electromagnet, and it will diminish in the same ratio as the distance between these members increases. In the present instance the repelling force is required to be greater at the beginning of the reversal of the signal than at the end of the reverse movement, so as to overcome the friction which necessarily exists (even if only to a small extent) between the circuit-breakers and the permanent-magnet arm of the signal, a circumstance which will also tend to avoid any liability of the permanent-magnet arm being forced into greater frictional contact with said circuit-breakers, depending upon the extent to which the arm 52 enters between them. On the other hand, if the arm 52 is of such nature as to be attracted instead of repelled by the electromagnets, a condition which can be established by merely reversing the current in said electric magnets, it will be conceded that the attractive power for the signal-bar will not be as efficient during the first part of the signal movement as it will be when the signal-bar approaches the magnet, it being evident that the nearer the bar and its attracting-magnet will be to each other the greater the attractive force will become.

In recapitulation as to the operation of my improved system, the signal will indicate just exactly in which condition the mail-box is, the target will be at the right and beneath the arrow X whenever there is any mail in the box, and the door of said box is closed, since the tray 10 is depressed, and the magnet 26 will immediately become energized, thus setting the signal-target as shown on the base-board *a*. If now any one opens the box-door or said door having been left inadvertently open, the signal will have a vibratory movement on its pivot and will maintain such movement until either the door is closed or the mail-matter removed, in which latter case the signal will be set, as indicated on base-board *b*, a condition which also exits on base-board *c* with which box C is connected and shown with its door open, while the box is empty, the signal indicating, of course, "No mail."

Having thus described my invention, what I claim is—

1. The combination, with a signal mounted for oscillation; a pair of oppositely-effective magnets for moving said signal in opposite directions; independent circuits for said magnets, respectively; and a circuit-closer in each of said circuits; of means for breaking the circuit for one magnet, and making the circuit for the other magnet, by the movement of said signal whereby when both circuit-closers are simultaneously closed, said magnets will be alternately energized to impart a vibratory movement to the signal.

2. The combination, with a signal mounted for oscillation; a pair of oppositely-effective magnets for moving said signal in opposite directions; and independent circuits for said magnets, respectively; of means for breaking the circuit for one magnet and making the circuit for the other magnet, by the movement of the signal; and a pair of independently-operable circuit-closers in said circuits, respectively whereby, when both closers are closed, a vibratory movement will be imparted to said signal.

3. The combination, with a signal; of a magnet controlling the movement of said signal, and a circuit therefor; of a receptacle; a circuit-closer disposed in said receptacle, and operable by the deposit of an article in said receptacle; and means for breaking said magnet-circuit by the movement of said signal.

4. The combination, with a signal; a magnet controlling the movement of said signal; and a circuit for said magnet; of a receptacle having a door; a circuit-closer disposed in said receptacle, and operable to close the circuit by the opening movement of said door; and means for breaking said circuit by the movement of said signal.

5. The combination, with a signal mounted for oscillation; a pair of oppositely-effective magnets for moving said signal in opposite directions; and independent circuits for said magnets, respectively; of a receptacle having a door; a pair of independent circuit-closers operable by the deposit of an article in said receptacle, and by the opening movement of said door, respectively; and means for breaking the circuit for one magnet and making the circuit for the other magnet, by the movement of said signal.

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