

No. 753,387.

PATENTED MAR. 1, 1904.

J. C. GLEASON.

ELECTRIC TRAIN ORDER AND SIGNALING SYSTEM.

APPLICATION FILED JULY 24, 1903.

NO MODEL.

5 SHEETS—SHEET 1.

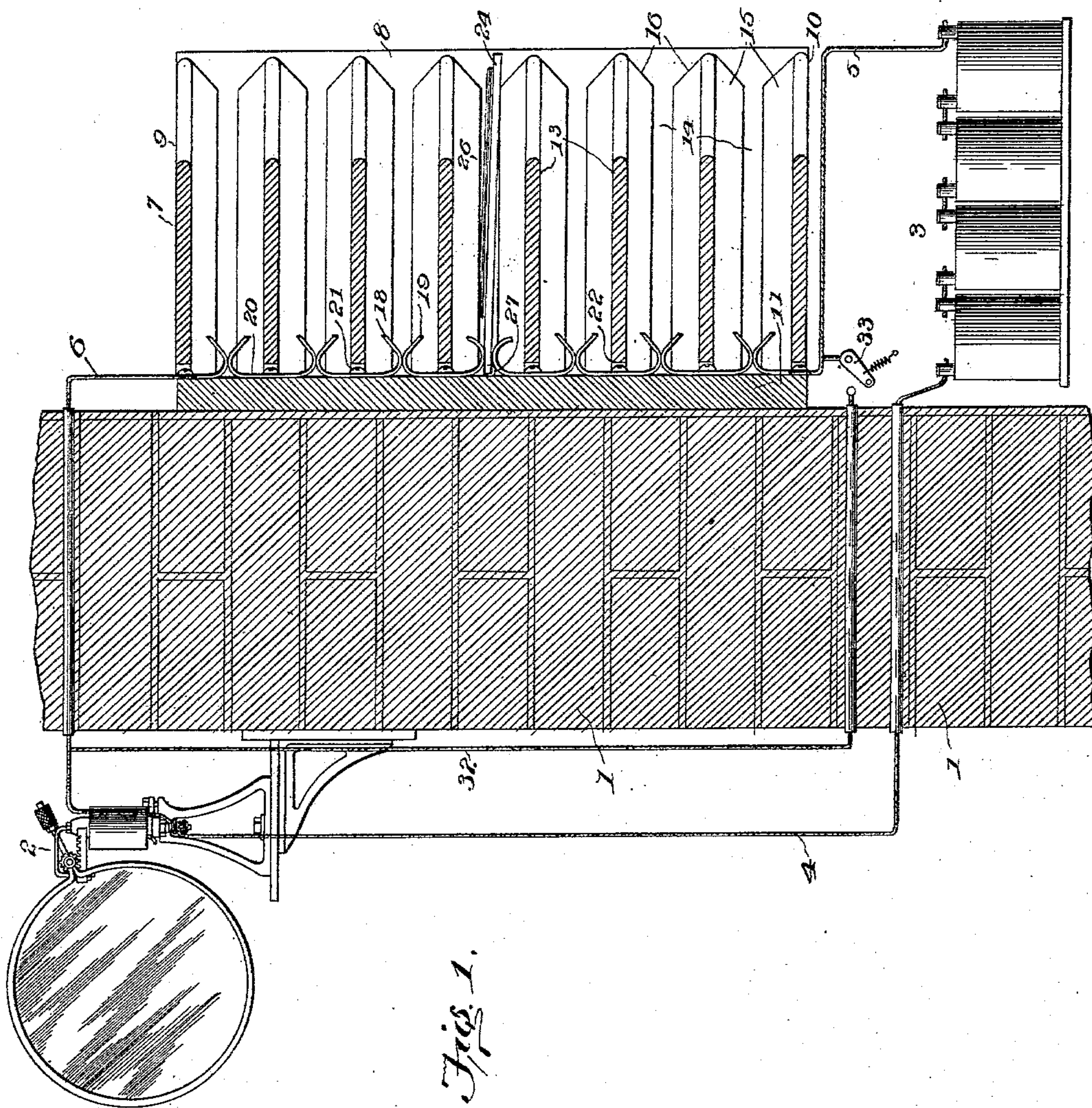


Fig. 1.

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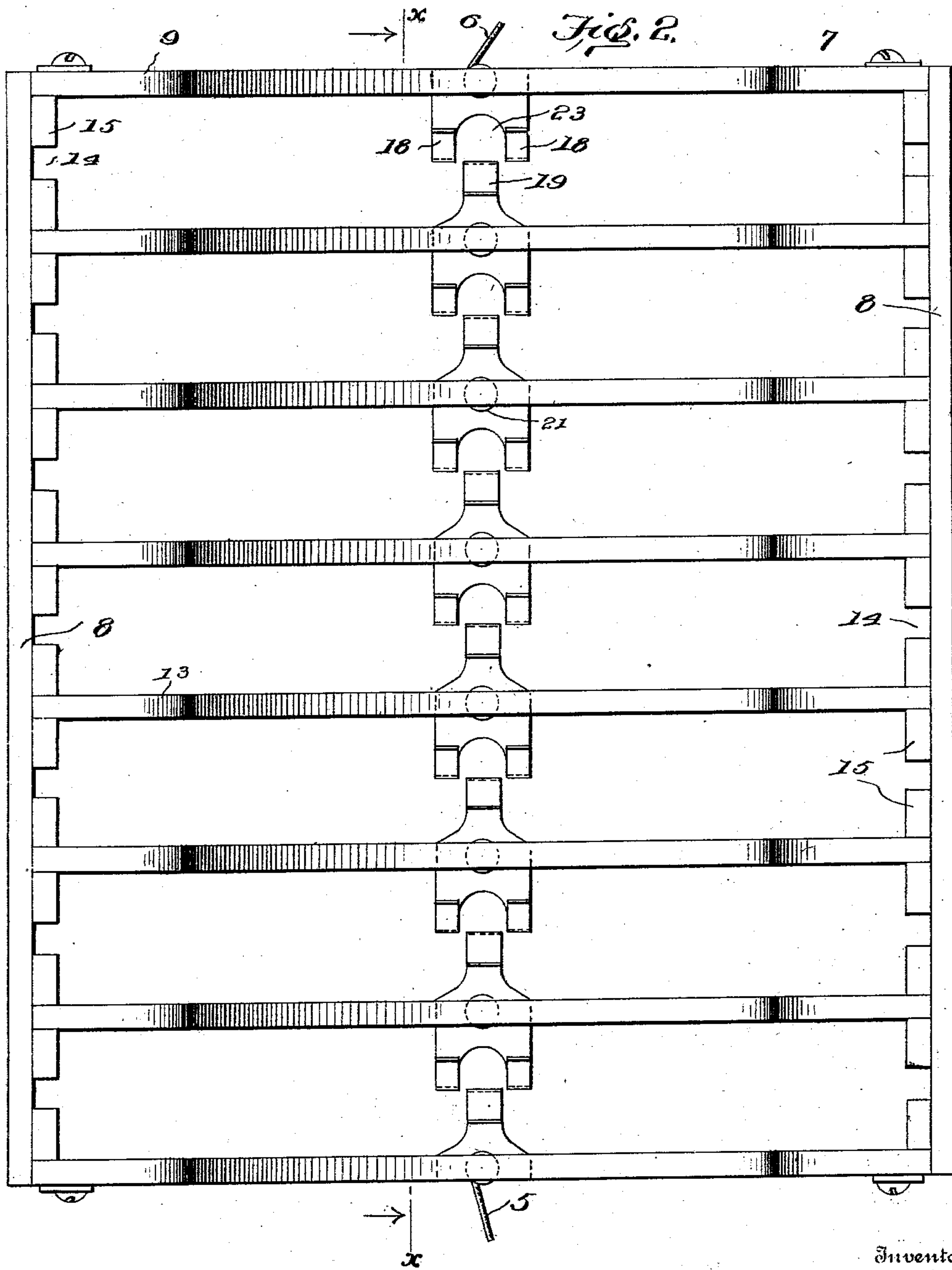
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5 SHEETS—SHEET 2.



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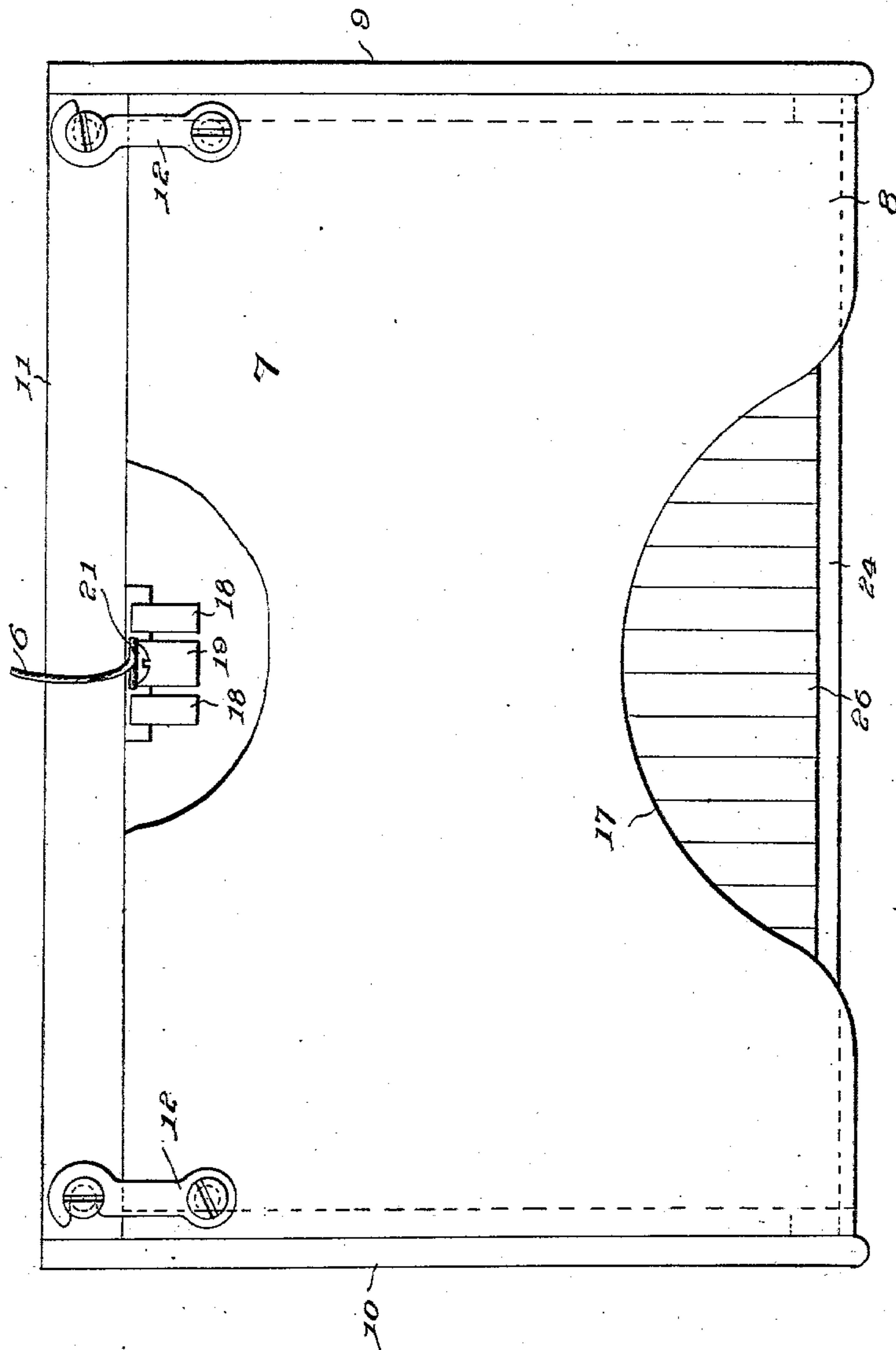
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5 SHEETS—SHEET 3.

Fig. 3.



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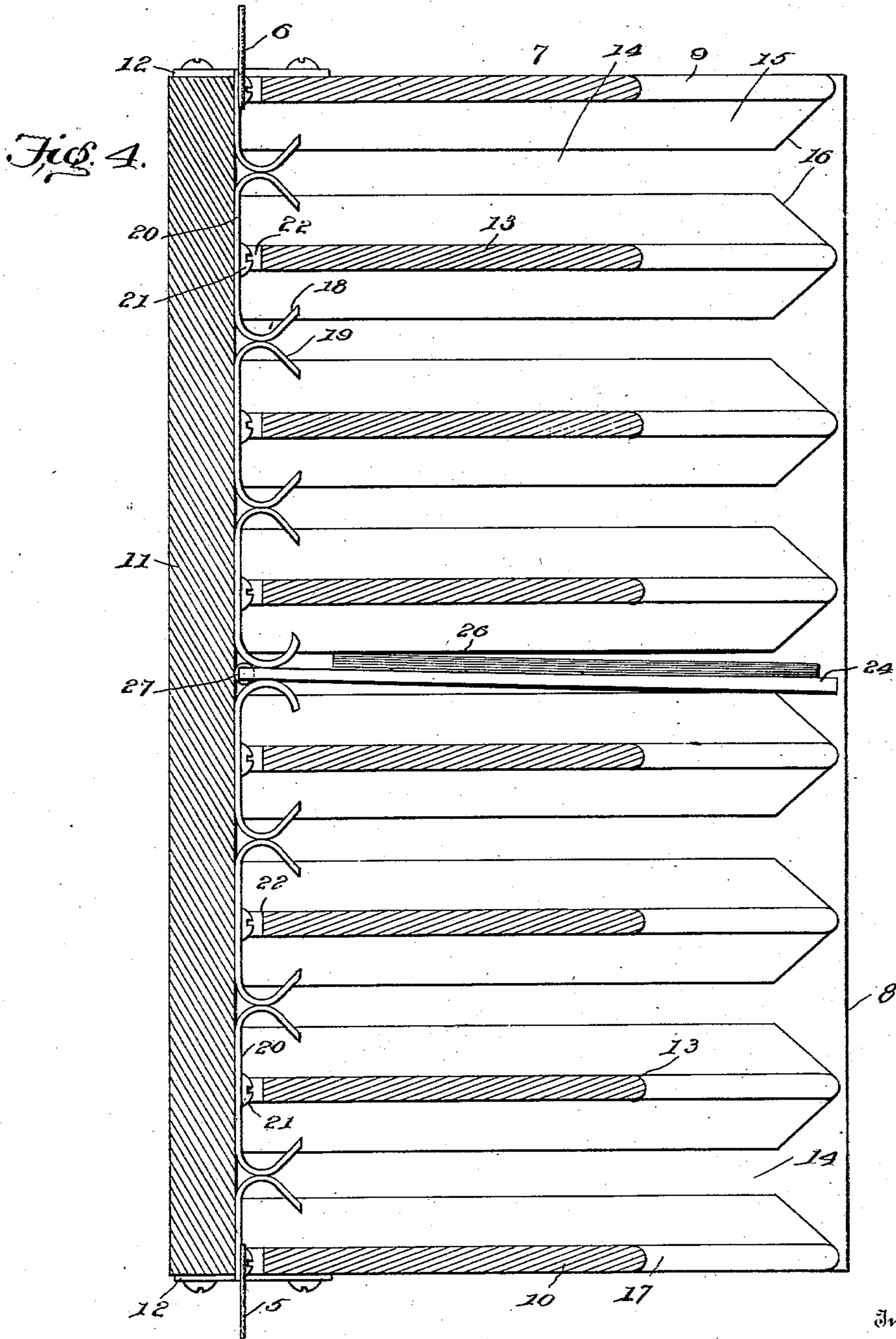
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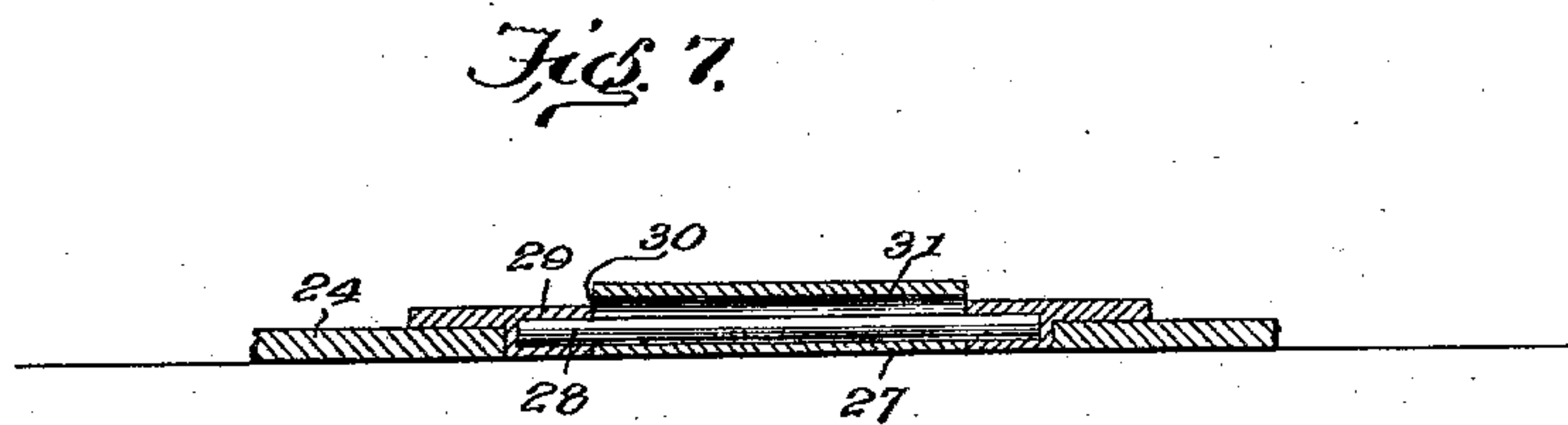
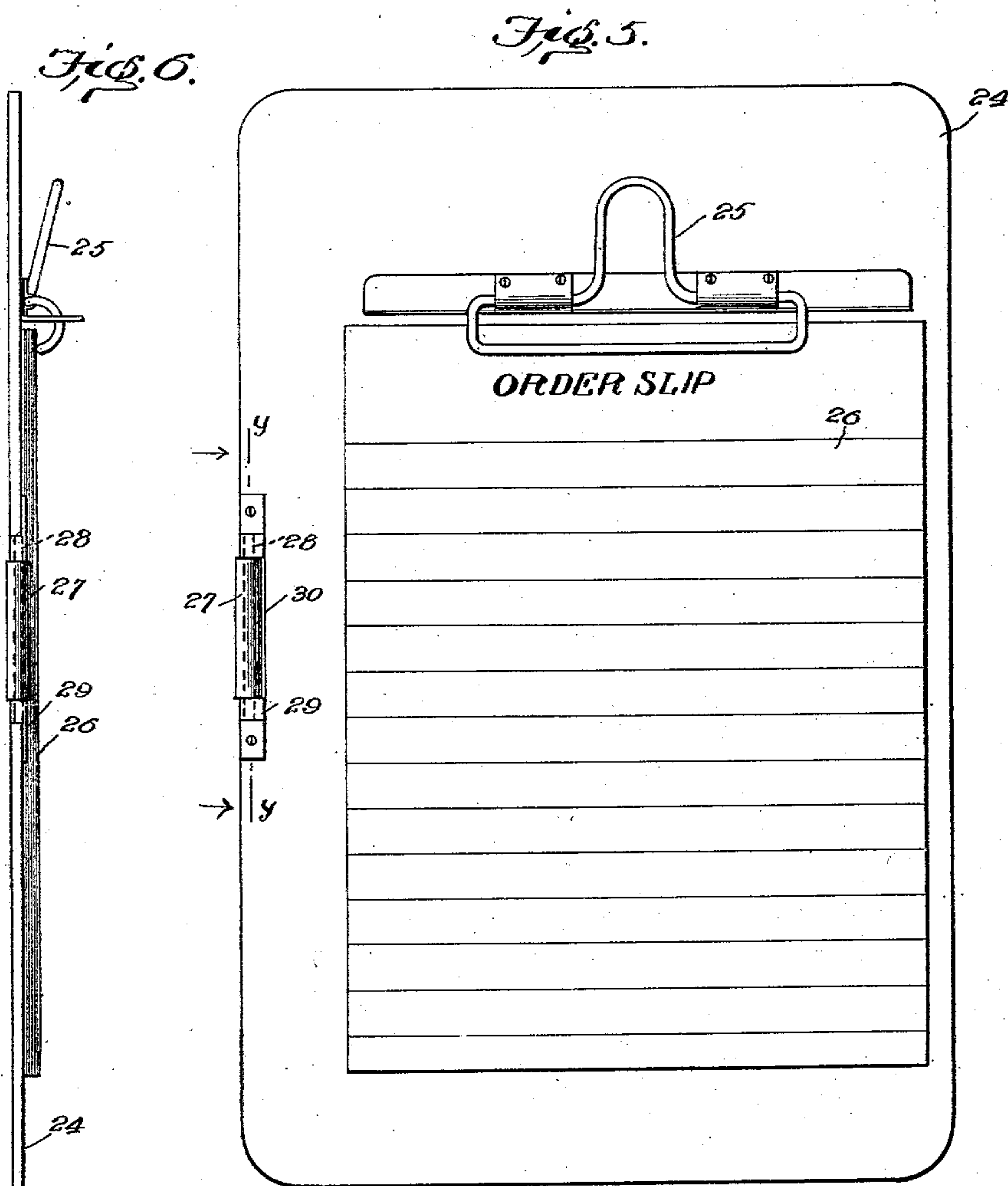
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5 SHEETS—SHEET 5.



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# UNITED STATES PATENT OFFICE.

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## ELECTRIC TRAIN ORDER AND SIGNALING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 753,387, dated March 1, 1904.

Application filed July 24, 1903. Serial No. 166,804. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN C. GLEASON, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Electric Train Order and Signaling Systems, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to electric train order and signaling systems, and has for its object to provide a construction whereby a semaphore-signal will be automatically set to "danger" whenever a train-order is received and written out by the operator and will be maintained in the danger position as long as any train-orders remain undelivered.

To this end my invention consists in certain novel features, which I will now proceed to describe and will then particularly point out in the claims.

In the accompanying drawings, Figure 1 is an elevation, partly in section, of an apparatus embodying my invention in one form. Fig. 2 is a front elevation of a train-order box forming a part of the system. Fig. 3 is a plan view of the same, partly broken away. Fig. 4 is a vertical sectional view of the train-order box, taken on the line *xx* of Fig. 2 and looking in the direction of the arrows. Fig. 5 is a front elevation of one of the order-boards. Fig. 6 is an edge view of the same, and Fig. 7 is an enlarged detail sectional view taken on the line *yy* of Fig. 5 and looking in the direction of the arrows.

Considered in its broadest sense, my invention consists of a battery or source of electricity, an electric circuit connected therewith, an electrically-operated semaphore-signal located in the circuit and arranged to indicate "safety" when the circuit is closed and "danger" when the circuit is open, a train-order-board-supporting device or box, normally separated contact-terminals in the circuit adjacent to the train-order-board-supporting device, and a removable train-order board supported and guided by the supporting device and adapted when placed in position therein to close the

circuit and set the signal to "safety" and when removed therefrom to open the circuit and set the signal to "danger."

My invention further includes within its scope such a system comprising a plurality of order-boards, a corresponding plurality of contact-terminals, and a supporting device having provision for separately supporting each board, whereby when any one board is removed from the supporting device the signal is set to "danger" and whereby the signal is set to "safety" when all of the order-boards are in position in the supporting device.

My invention further includes a system such as has just been defined comprising a switch, whereby the signal may be set to "safety" when the order-board or any one or more of a plurality of order-boards is or are removed from the supporting device.

In the drawings I have shown a form of my invention adapted for use at a railway-station where seven order-boards are used, although it will be understood that the system is adapted for use with any number of order-boards from one up. Referring to Fig. 1, the same illustrates a convenient arrangement of my system, in which 1 indicates the wall of the station, having arranged externally thereon a signal 2, which may be an electrically-operated semaphore-signal of any suitable construction.

The particular form of signal which I have shown is one set forth in an application filed by William U. Colthar, of even date herewith, its character being such that it is set to "danger" when the circuit is open and to "safety" when the circuit is closed.

3 indicates a battery or other suitable source of electricity, and 4 a wire forming part of the electric circuit and connecting the battery directly with the signal 2.

5 indicates a wire forming part of the circuit and connecting the battery with the order-board-supporting device, hereinafter termed the "order-box" for brevity's sake.

6 indicates a wire connecting the order-box with the signal and in connection with the contact-terminals, hereinafter referred to, com-



pleting the circuit. The supporting device, (indicated as a whole by the reference-numeral 7,) preferably consists of a box-like structure open at the front and comprising side members 8, a top 9, a bottom 10, and a removable back 11, secured in position by hooks 12 or in any other suitable manner. The interior of the box is divided into any suitable number of compartments by horizontal partitions 13, and each compartment is provided on each side with guideways 14 to receive and support an order-board and guide the same to the contact-terminals. The guideways 14 are preferably formed by strips 15, secured to the inner surface of the side pieces 8, as shown. The front ends of these strips 15 are preferably beveled off, as indicated at 16, to facilitate the introduction of the order-boards. The top and bottom of the box and the partitions 13 are preferably cut away at their central front portions, as indicated at 17, to permit the order-boards to be readily grasped and removed.

In connection with each compartment of the order-box I employ a pair of contact-terminals 18 and 19, so located with respect to the guideways 14 that when the order-board is inserted in said guideways and pushed back into its compartment the normally broken circuit at said terminals will be closed. This I preferably accomplish by interposing between the terminals a metallic portion of the order-board, which enters between the terminals and makes a contact with both of them and an electrical connection between them. The form of contact which I prefer is that shown, consisting of a plate 20, secured by a screw 21 to the front face of the back 11 of the board. Each compartment 13 is cut away at its rear end, as indicated at 22, to accommodate the plate and screw. At its lower end each plate 20 is bifurcated to form two curved resilient contact-arms 18, having a space 23 between them. The upper end of each plate 20 forms a single curved resilient arm 19, lying opposite the space 23 and of less width than that space. By reason of this construction in case the upper contact-arms 18 should fall below their normal position by weakening of the metal or loosening of the fastenings they will not come into contact with the lower arm 19, and thus close the circuit when the order-board is removed. The contact portions of the arms 18 and 19 lie in about the same plane, as shown in Fig. 2, and their front ends diverge, as shown in Fig. 4, so that the order-board will easily enter between them and force them apart, causing them to bear firmly upon said board, so as to give a good electrical contact. Moreover, said arms have a rubbing frictional contact with the board during the insertion and removal of the same, which will serve to keep the contact-surface bright and clean and preserve the electrical contact. The

wire 5 is connected to the lowermost plate 20, and the wire 6 is connected to the uppermost plate 20. The order-board is shown in Figs. 5, 6, and 7 and is preferably constructed of metal, aluminium being the preferred material. It consists of a board proper or body 24, provided with a clip 25 to hold the order slips or sheets 26, and the usual carbon-sheet interposed between them for the purpose of duplicating the orders. Of course it will be understood that only that portion of the order-board which lies between the contact-terminals when the board is in position in the box need be made of conductive material. In order to prevent accidental displacement of the board after it has been inserted in the box, I provide a detent coöperating with the spring contact-arms and serving to hold the board in place unless a considerable force is employed to pull it out of the box. This detent consists of a sleeve or tubular roller 27, of greater diameter than the thickness of the board, said sleeve being mounted on a pin or axis 28, supported in brackets 29 at each end of a slot 30 in the rear edge of the board. The diameter of the bore or opening 31 of the sleeve 27 is considerably greater than the diameter of the pin or axis 28. It results from this construction that when the order-board is inserted in its guideways and forced home the sleeve 27 will first come into contact with the spring-arms 18 and 19 and will force them apart a sufficient distance to permit said sleeve to pass between them. The spring-arms will then again approach each other and will bear against that portion of the order-board immediately in front of the sleeve, so as to close the circuit at that particular point. In case of any accidental movement of the order-board outward, which would tend to permit it to slip from between the contact-arms, the sleeve will come into contact with the rear converging surfaces of the spring-arms and will prevent further outward movement of the board. When the board is intentionally removed, however, a pull of sufficient strength thereon will cause the sleeve to force the spring-arms apart sufficient to let said sleeve pass, and thus permit the ready removal of the board. The bore of the sleeve is made larger than the pin which passes through it, so that when the board is laid upon a level surface, such as the top of the operator's desk or table, for the purpose of writing on it the sleeve will move upward, as shown in Fig. 7, and will not project below the bottom of the board, which thus presents a smooth even under surface adapted to rest firmly upon the desk or table.

The operation of the system so far as thus described is as follows: The apparatus being installed at a railway-station and there being no train-orders for the operator to deliver, all of the order-boards are in their compartments in the box and the circuit is closed, so that the



signal is set for "safety." As soon as a train-order is received by the operator he removes the proper order-board from the order-box, and by this action he breaks the circuit and sets the signal to "danger." If this order is delivered before another order is received, the order-board is replaced in the box after such delivery and the signal is again set to "safety" by the mere act of placing the order-board in position in the box. If, on the other hand, one or more other train-orders have been received before the first order is delivered, the appropriate order board or boards are also removed from the box, and the replacing of the first order-board does not set the signal to "safety," since this only occurs when there are no train-orders to be delivered and all of the order-boards are in the box. In this way failure to deliver a train-order, due to negligence of the operator in failing to set the signal to "danger," is prevented. It will be understood, of course, that the setting of the signal to "danger" insures the stoppage of any train which reaches the station and which might otherwise pass the station without receiving an order intended for it.

It is sometimes the case that special or fast trains are due to pass the station during the time when train-orders for other trains have been received at the station and have not yet been delivered. In order to prevent the unnecessary stoppage of these trains, I provide a shunt-circuit passing around the order-box and connecting the battery directly with the signal, such shunt-circuit being controlled by a switch which may be operated by the operator to set the signal to "safety" at will irrespective of the order-box. Such switch is preferably a normally open or self-opening switch, so that it will remain closed only so long as the operator holds it closed. In this way the operator is prevented from negligently leaving the signal at "safety" after the special train has passed. In Fig. 1 I have shown this shunt-circuit as consisting of a wire 32 connecting the wires 5 and 6 directly, the spring-opening or normally opened switch being indicated at 33.

I do not wish to be understood as limiting myself to the precise details of construction hereinbefore described, and shown in the accompanying drawings, as the same may be obviously modified without departing from the principle of my invention.

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

1. An electric train order and signaling system, comprising a battery and circuit, an electrically-operated semaphore-signal located in the circuit and acting to indicate safety when the circuit is closed, and danger when the circuit is open, a train-order-board-supporting device, normally open contact-terminals in the circuit in operative relation to said support-

ing device, and a removable train-order board supported by said device and adapted, when placed in position therein, to close the circuit and set the signal to safety, substantially as described.

2. An electric train order and signaling system, comprising a battery and circuit, an electrically-operated semaphore-signal located in the circuit and acting to indicate safety when the circuit is closed, and danger when the circuit is open, a train-order-board-supporting device adapted to receive a plurality of train-order boards, a corresponding plurality of normally open contact-terminals arranged in series in the circuit, and a plurality of removable train-order boards supported by said device, each board being adapted, when placed in position in the supporting device, to close the circuit at the corresponding contact-terminals, whereby, when all of the boards are in position, the signal is set to safety, and whereby the signal is set to danger when any one or more of the boards are removed, substantially as described.

3. An electric train order and signaling system, comprising a battery and circuit, an electrically-operated semaphore-signal located in the circuit and acting to indicate safety when the circuit is closed, and danger when the circuit is open, a train-order-supporting device, normally open contact-terminals in the circuit in operative relation to said supporting device, a removable train-order board supported by said device and adapted, when placed in position therein, to close the circuit and set the signal to safety, a shunt-circuit around said contact-terminal, and a switch controlling said shunt-circuit, substantially as described.

4. An electric train order and signaling system, comprising a battery and circuit, an electrically-operated semaphore-signal located in the circuit and acting to indicate safety when the circuit is closed, and danger when the circuit is open, a train-order-supporting device, normally open contact-terminals in the circuit in operative relation to said supporting device, a removable train-order board supported by said device and adapted, when placed in position therein, to close the circuit and set the signal to safety, a shunt-circuit around said contact-terminal, and a normally open or self-opening switch controlling said shunt-circuit, substantially as described.

5. An electric train order and signaling system, comprising a battery and circuit, an electrically-operated semaphore-signal located in the circuit and acting to indicate safety when the circuit is closed, and danger when the circuit is open, a train-order-board-supporting device consisting of a box having a plurality of compartments and guideways, the circuit having a pair of normally open contact-terminals in each compartment, and a plurality of



removable train-order boards, one for each compartment, each board being adapted, when inserted in its compartment, to close the circuit at the contact-terminals of said compartment, substantially as described.

6. In an electric train order and signaling system of the character described, a train-order box having contact-terminals arranged the one above the other, one terminal having two contact-arms with an intervening space, and the other terminal having a single contact-arm of less width than said space, opposite which it lies, and a train-order board adapted to be inserted in said box and between said terminals to close the circuit between them, substantially as described.

7. In an electric train order and signaling system of the character described, an order-box having separate compartments and a removable back, and a series of metallic plates mounted on said back and each provided at one end with two contact-arms having an intervening space, and at the other end with a single contact-arm of less width than said space, the adjacent ends of the plates lying opposite each other in the respective compartments, substantially as described.

8. In a train order and signaling system, an order-box provided with a compartment having spring contact-arms lying opposite each

other, a train-order board engaging said arms, and a detent cooperating with said contact-arms to prevent accidental displacement of the board, substantially as described.

9. In a train order and signaling system, an order-box having a compartment provided with spring contact-arms lying opposite each other and diverging both forwardly and rearwardly, in combination with an order-board adapted to be inserted between said contact-arms, and provided with an enlargement adapted to pass between said arms to engage them from the rear to prevent accidental displacement of the board, substantially as described.

10. In a train order and signaling system, the combination, with an order-box having spring contact-arms arranged opposite each other and diverging both forwardly and rearwardly, of an order-board provided with a pin or axis, and a sleeve of relatively large diameter loosely mounted on said pin or axis, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN C. GLEASON.

Witnesses:

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IRVINE MILLER.