

(No Model.)

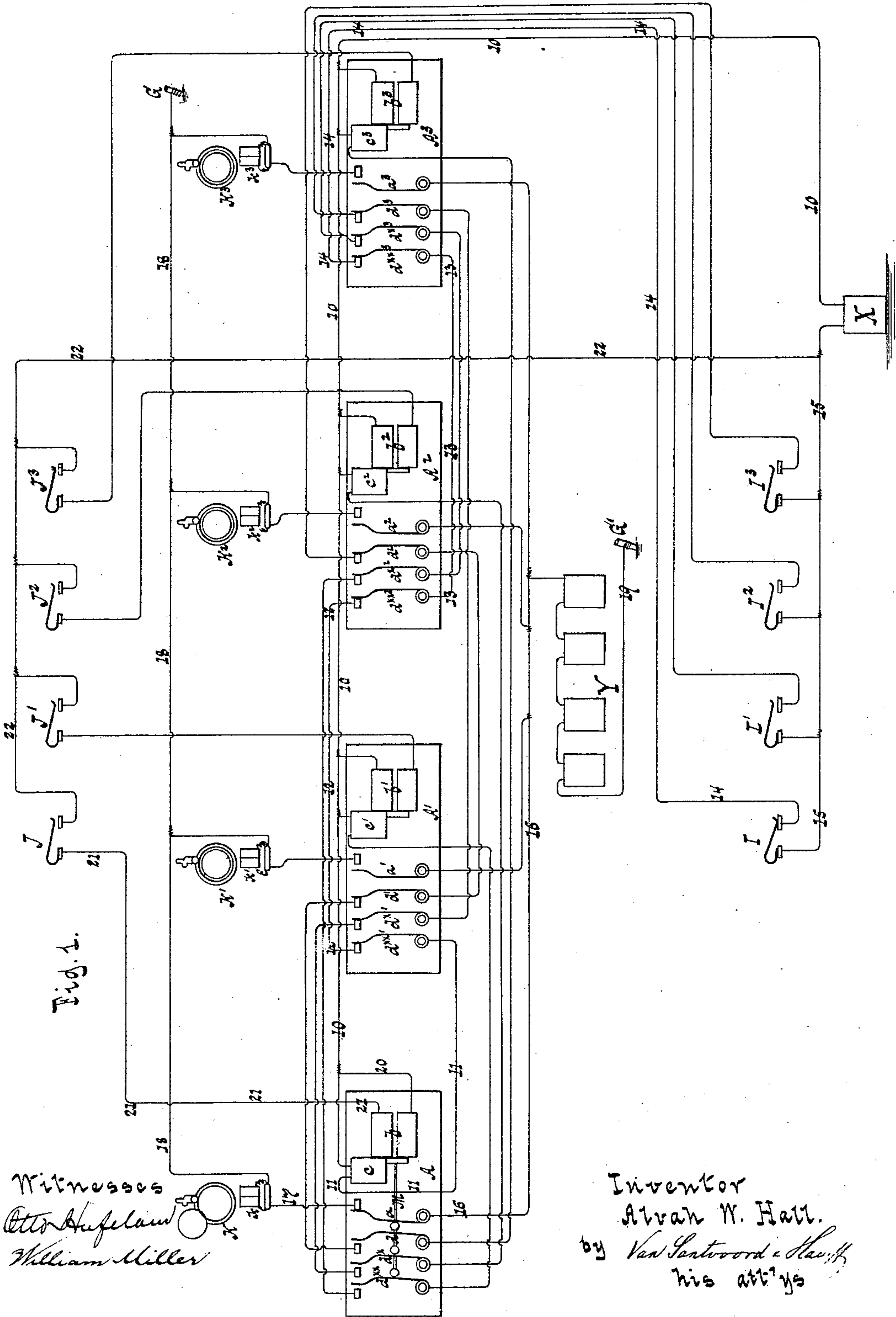
2 Sheets—Sheet 1.

A. W. HALL.

APPARATUS FOR INTERLOCKING ELECTRIC SIGNALS.

No. 284,842.

Patented Sept. 11, 1883.



Witnesses
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William Miller

Inventor
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Fig. 2

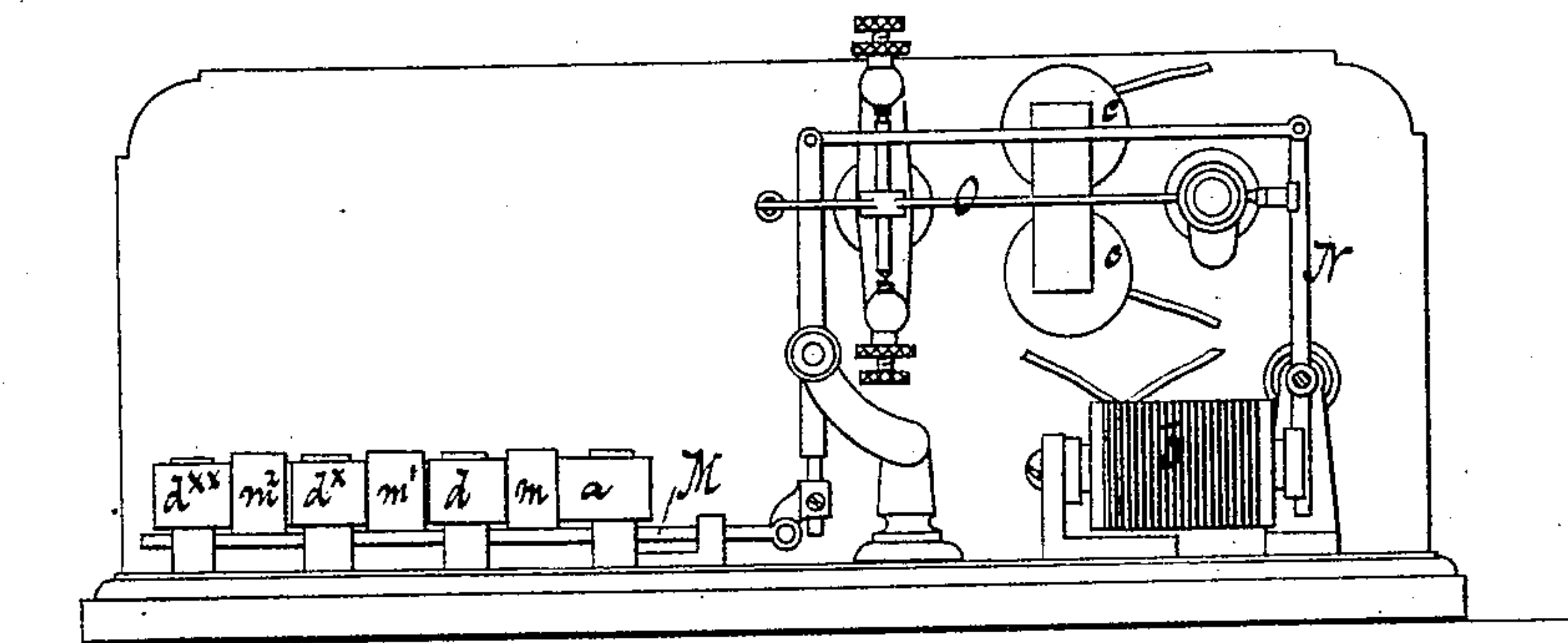
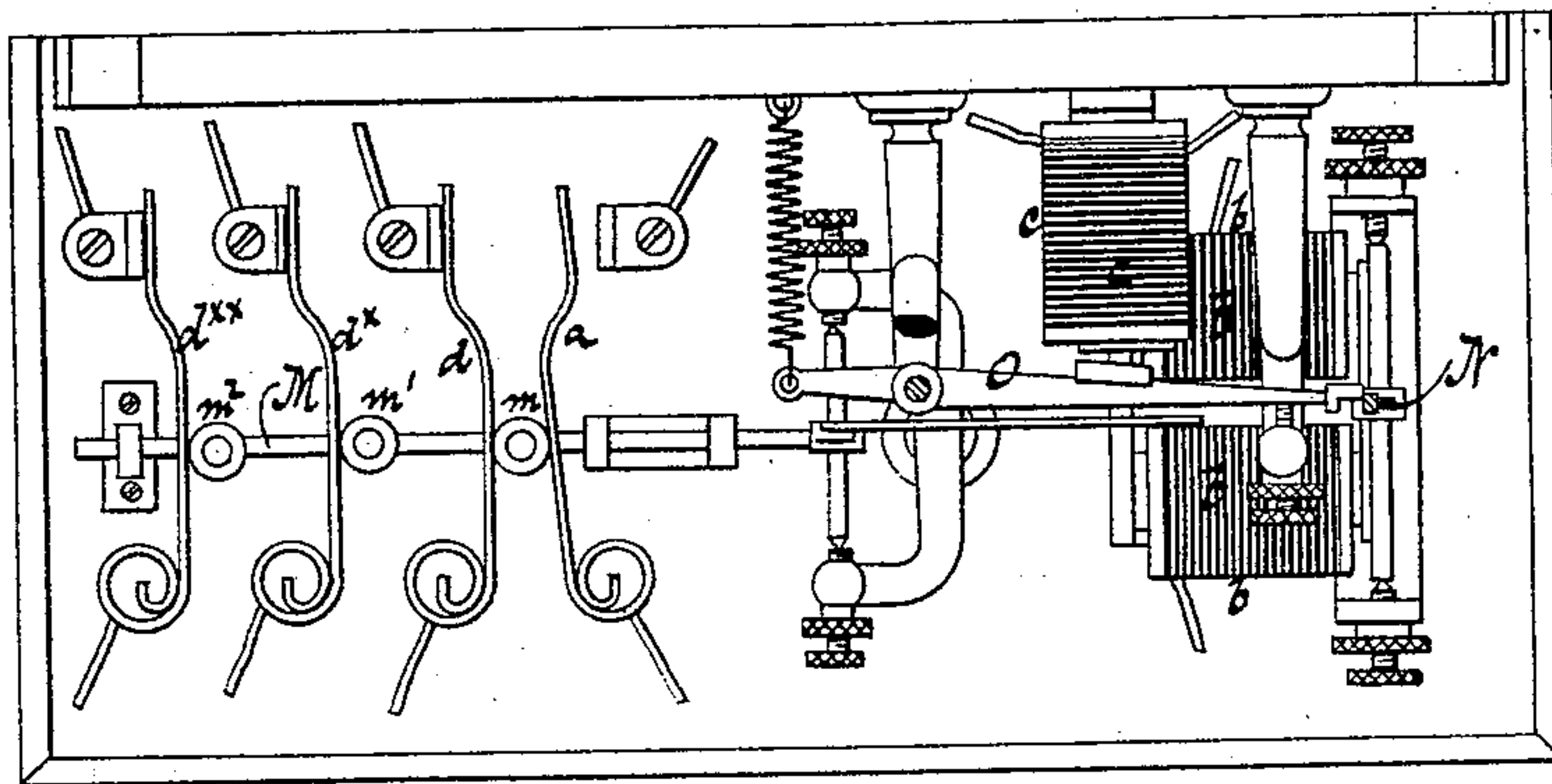


Fig. 3.



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UNITED STATES PATENT OFFICE.

ALVAH W. HALL, OF MERIDEN, CONNECTICUT.

APPARATUS FOR INTERLOCKING ELECTRIC SIGNALS.

SPECIFICATION forming part of Letters Patent No. 284,842, dated September 11, 1883.

Application filed May 17, 1883. (No model.)

To all whom it may concern:

Be it known that I, ALVAH W. HALL, a citizen of the United States, residing at Meriden, in the county of New Haven and State of Connecticut, have invented new and useful Improvements in Apparatus for Interlocking Electric Signals, of which the following is a specification.

The object of this invention is to combine two or more signals with suitable keys and batteries and with double-circuit instruments in such a manner that only one signal at a time can be moved from its normal position, indicating "danger," to a position indicating "safety."

The peculiar construction of my apparatus is pointed out in the following specification and illustrated in the accompanying drawings, in which—

Figure 1 represents a diagram illustrating my apparatus as applied to four signals. Fig. 2 is a side view of one of the double-circuit instruments forming part of said apparatus. Fig. 3 is a plan or top view of the same.

Similar letters indicate corresponding parts.

In the drawings, the letters $A A' A^2 A^3$ designate interlocking or double-circuit instruments, the construction of which is illustrated in Figs. 2 and 3. Each of these instruments consists of a main electro-magnet, b , and a releasing electro-magnet, c . With the armature-lever N of the main magnet b is connected a rod, M , which carries three tappets, $m m' m^2$. These tappets act on springs $a d d^{\times} d^{\times \times}$, respectively, in such a manner that when the armature of the main electro-magnet is attracted the springs $d d^{\times} d^{\times \times}$ are closed and the spring a is opened. The springs $d d^{\times} d^{\times \times}$ I term "left" closing-springs, and the spring a "right" closing-spring. The armature-lever O of the releasing-magnet is in such a position that it serves to lock the armature-lever N whenever the main magnet has been momentarily vitalized, and consequently retains the springs $d d^{\times} d^{\times \times}$ closed and the spring a open until the releasing-magnet c is vitalized, whereby the armature-lever N is released and permitted to fall back, when the springs $d d^{\times} d^{\times \times}$ are opened and spring a is closed. This interlocking or double-circuit instrument forms the subject-matter of a separate application

bearing even date with this, and in the foregoing I have given only sufficient explanation to render the following description intelligible.

In the diagram Fig. 1, I have shown four of my interlocking instruments, $A A' A^2 A^3$, as applied to the operation of four signals, $K K' K^2 K^3$, which are so constructed that they drop in sight to a position indicating "danger" by their own gravity, and that they are raised out of sight to a position indicating "safety" by the action of electro-magnets $k k' k^2 k^3$. All these electro-magnets can be included in circuits from the battery Y , while the electro-magnets of all the interlocking instruments can be included in circuits from battery X . These circuits are controlled by a series of keys, $I I' I^2 I^3, J J' J^2 J^3$, the keys $I I' I^2 I^3$ being operated by hand, and serving to raise the several signals out of sight, while the keys $J J' J^2 J^3$ may be operated by the wheels of a train or otherwise, and serve to restore the signals to a position of "danger." When the apparatus is in its normal position, the armature-levers of the main magnets $b b' b^2 b^3$ of all the interlocking instruments are locked by the armature-levers of the releasing-magnets $c c' c^2 c^3$, the right closing-spring $a a' a^2 a^3$ are open, and the left closing-springs $d d^{\times} d^{\times \times}, d' d^{\times'} d^{\times \times'}$, $d^2 d^{\times 2} d^{\times \times 2}, d^3 d^{\times 3} d^{\times \times 3}$ are closed. All the signals $K K' K^2 K^3$ show "danger," and all the keys $I I' I^2 I^3, J J' J^2 J^3$ are open. If the hand-key I is momentarily depressed, as shown in Fig. 1, a circuit is closed from battery X through wire 10, electro-magnet c , wire 11, spring $d^{\times \times'}$, wire 12, spring $d^{\times \times 2}$, wire 13, spring $d^{\times \times 3}$, wire 14, key I , and wire 15, back to the battery, the armature-lever of the electro-magnet b is released, the spring a is closed, and the springs $d d^{\times} d^{\times \times}$ are opened. A circuit is now closed from battery Y through wire 16, spring a , wire 17, signal-magnet k , wire 18, to ground G , thence to ground G' , and through wire 19 back to the battery. The signal K is raised to a position of "safety," and it remains in this position until a circuit is closed through electro-magnet b , as will be presently explained. As long as the signal K remains in the position of "safety," neither of the remaining signals can be disturbed from its position of "danger," for in order to raise the signal K' , for instance, to its position of "safety," it is necessary to

close the spring a' , which can only be done by vitalizing the electro-magnet c' ; but in order to close a circuit through this electro-magnet the spring d^{xx} of interlocking instrument A must be closed. In the same manner the electro-magnet c^2 cannot be vitalized before the spring d^x of the interlocking instrument A is closed, and the electro-magnet c^3 cannot be vitalized before the spring d is closed. If the restoring-key J is now closed momentarily, a circuit is closed from battery X through wires 10 and 20, electro-magnet b , wire 21, key J, and wire 22, back to the battery, the armature of the electro-magnet is attracted and the lever is locked by the armature-lever of the electro-magnet c , the spring a is opened and the springs d d^x d^{xx} are closed, and by opening the spring a the circuit through signal-magnet k is broken and the signal K returns to "danger."

From this description it will be seen that by connecting two or more interlocking instruments, each of which is provided with right and left closing-springs, and a corresponding number of hand-keys and restoring-keys with two batteries, the circuit of one of which includes all the left closing-springs, while the circuit of the other includes all the right closing-springs, no circuit can be closed through the right closing-springs in two different interlocking instruments at the same time, and whenever one of the interlocking instruments has been thrown out of its normal condition by depressing the corresponding hand-key neither of the remaining interlocking instruments can be disturbed before the first instrument has been restored to its normal con-

dition by depressing the corresponding key. By these means the person having charge of the hand-keys has complete control over any desired number of electric signals.

It must be remarked that one and the same restoring-key may be connected so as to actuate two or more signals.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, substantially as hereinbefore described, of two or more interlocking instruments, each of which is provided with right and left closing-springs, a corresponding number of hand-keys, one or more restoring-keys, and two batteries, the circuit of one of which includes all the left closing-springs, while the circuit of the other includes all the right closing-springs.

2. The combination, substantially as hereinbefore described, of two or more interlocking instruments, each of which is provided with right and left closing-springs, a corresponding number of hand-keys, one or more restoring-keys, two batteries, the circuit of one of which includes all the left closing-springs, while the circuit of the other includes all the right closing-springs, and a series of electric signals corresponding in number to the number of interlocking instruments.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

ALVAH W. HALL. [L. S.]

Witnesses:

W. HAUFF,

E. F. KASTENHUBER.