

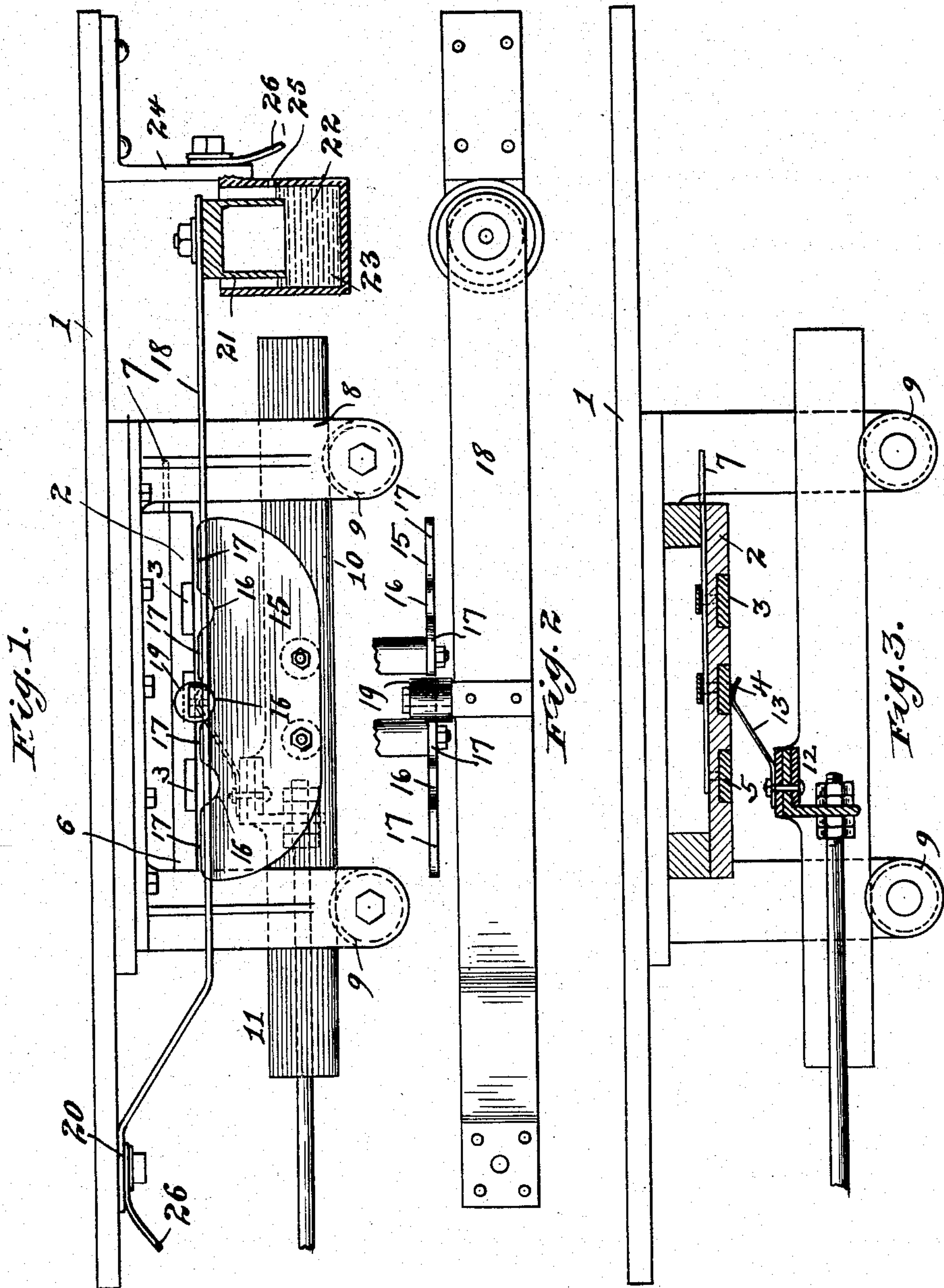
No. 673,565.

Patented May 7, 1901.

W. MORRISON.  
ELECTRIC CONTROLLER.  
(Application filed June 18, 1900.)

2 Sheets—Sheet 1.

(No Model.)



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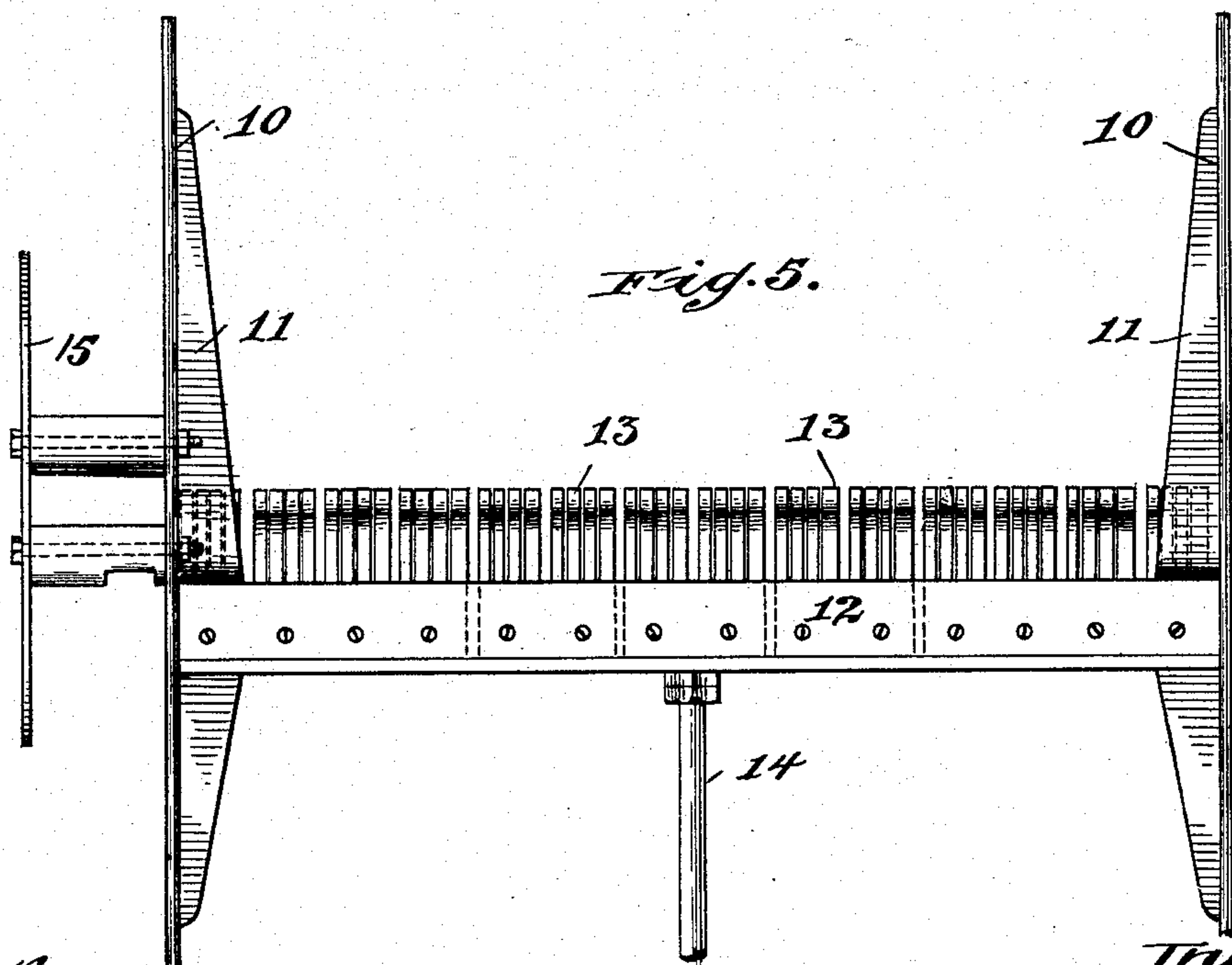
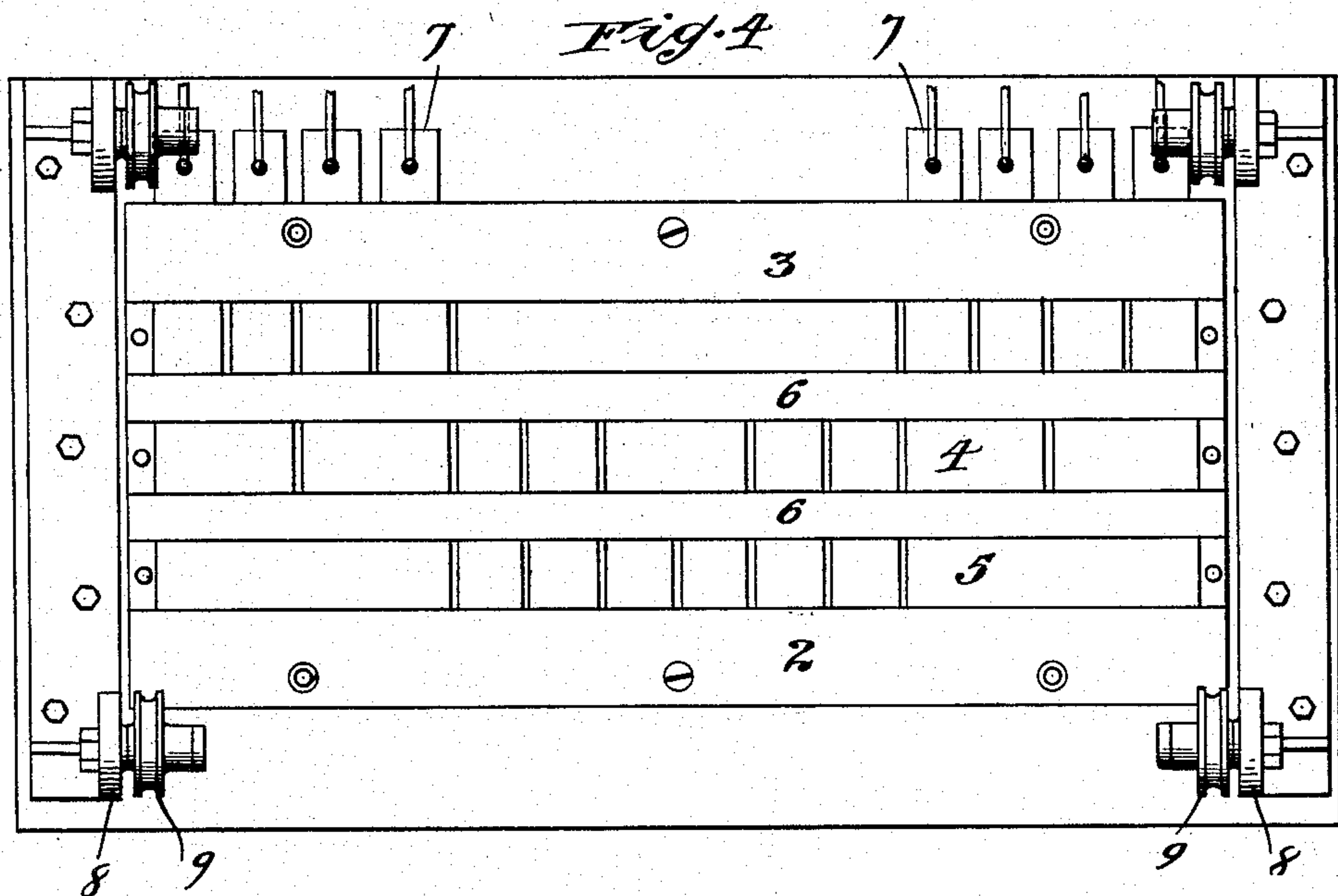
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2 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE.

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## ELECTRIC CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 673,565, dated May 7, 1901.

Application filed June 18, 1900. Serial No. 20,861. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM MORRISON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric Controllers, of which the following is a specification.

This invention relates to electric controllers, and has for its object to provide a device of this character so constructed that sparking or formation of the electric arc when the controller-brushes are being shifted from one contact to another will be effectually prevented.

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 a side elevation, partly in section, of a controller embodying my invention in one form. Fig. 2 is a plan view of a portion of the same. Fig. 3 is a longitudinal sectional view. Fig. 4 is an inverted plan view of the contact-board, and Fig. 5 is a similar view of the commuting-bar and its carriage.

In the said drawings I have shown as an embodiment of my invention a form of apparatus which is more particularly devised for use in connection with motor-vehicles and which is adapted to be secured to the under side of the body of the vehicle. In this construction, 1 indicates a suitable base or support, to which the various portions of the apparatus are connected, and 2 indicates the contact-board, constructed of a suitable insulating material and having thereon three parallel series of contacts, (indicated at 3, 4, and 5,) separated by intervening strips of insulating material 6. The battery connections are indicated at 7, and the contacts of the several series are suitably connected so as to give the different voltages which may be desired. For instance, in the particular arrangement shown if connected with four sets of ten batteries each the arrangement is such that when the commuting-bar is in contact with the first series, bearing the reference-numeral 3, four sets of ten cells each will be in series, giving twenty volts, while when the commuting-bar is in contact with

the second series, 4, two sets of twenty cells each in series will give forty volts, and in the case of the third series of contacts, 5, forty of the cells will be in series and eighty volts will be obtained. The connections and arrangement of parts of which these results may be obtained are well known to those skilled in the art and need no detailed description here. Downwardly-extending bracket-arms 8 are provided with grooved rollers 9, on which travel the runners 10 of a carriage 11, in which is mounted the commuting-bar 12, having the contact-brushes 13. This carriage may be actuated in any suitable manner so as to cause the brushes to move over the contact-board—as, for instance, by means of a rod 14, connected to a suitable operating-lever or other device for the purpose.

The parts just described may be of any suitable description for their purpose, as their structure does not constitute an essential part of my invention in its broadest form.

In conjunction with the contact-board and commuting-bar I employ a circuit-breaking device located in the main circuit and controlled by the movements of the commuting-bar, so that the circuit will be broken before the brushes of said bar leave one of the series of contacts of the contact-plate and will remain broken until after the brushes have come into contact with the next series, whereupon the circuit will be closed again. In the construction shown I employ for this purpose a cam-plate 15, carried by the carriage 11 and provided on its upper end with a cam-surface having depressions 16, corresponding in number and location with the series of contacts 3, 4, and 5, and having intermediate and terminal elevated portions 17, which correspond with the insulated surface portions of the board 2. A yielding arm 18 coöperates with this cam-plate, being provided for this purpose with a roller 19, which bears upon the cam-surface of said plate. In the particular form shown the arm 18 is a spring-arm, being secured at one end to the base 1, as indicated at 20, while its other or free end carries a contact 21, which may be of the tubular or cup-like form shown. Coöperating with the contact 21 is a fixed contact, preferably consisting of a cup 22, containing mercury 23 and



supported by a bracket 24 from the support 1. The mercury-cup is provided with an overflow-orifice 25, so that the same may be readily filled to the proper level without any possibility of creating or maintaining too high a level, and thereby affecting the operativeness of the circuit-breaking device. The main circuit is indicated at 26, being connected at one end to the fixed end of the arm 18 and at the other end to the cup 22 or its supporting-bracket.

It will be seen that as the commuting-bar is moved over the contact-board the yielding arm 18 will be raised and lowered, so as to make and break the main circuit, and it will be also observed that the construction and arrangement of the cam-plate and contact-board are such that the main circuit will be broken before the commuting-brushes break their contact with any one of the series of contacts of the board and that the circuit will remain broken until the brushes have again come into contact with any one of the series of board-contacts, so that the main circuit is always broken when the controller-contact is to be either made or broken. In this way all sparking or formation of the electric arc between the elements of the controller proper is prevented and all danger of burning out of these parts is obviated. The employment of a non-oxidizing contact in the main circuit, such as the cup of mercury shown and described, reduces the deterioration at this point to a minimum, and the supply of mercury may readily be renewed as required.

I do not wish to be understood as limiting myself to the precise details of construction or arrangement of parts hereinbefore set forth, as the same may obviously be modified without departing from the principle of my invention.

I claim—

1. In an electric controller, the combination with a fixed contact-board having two or more longitudinally-separated series of insulated contacts, of a carriage comprising a rigid frame having a pair of laterally-separated parallel side plates or ways, each engaging, and supported by, a plurality of guide-rollers, whereby said carriage is guided to move parallel with the face of the contact-board, commuting-brushes mounted upon said carriage to slide over the contact-board

when the carriage is reciprocated, a cam-plate carried by the carriage, a yielding lever engaging said cam-plate, a fixed contact for the free end of said lever and electrical connections for the several contacts and brushes, said cam-plate being shaped and operating upon the lever to open the circuit at the lever-contact only while the brush-contacts are in electrical contact, substantially as described.

2. In an electric controller, the combination with a fixed contact-board having two or more longitudinally-separated series of insulated contacts, of a carriage comprising a rigid frame having a pair of laterally-separated parallel side plates or ways, each engaging, and supported by, a plurality of guide-rollers, whereby said carriage is reciprocated, a cam-plate carried by the carriage, a yielding lever engaging said cam-plate, a fixed contact for the free end of said lever, a mercury-cup contact with which said lever-contact coöperates, and electrical connections for the several contacts and brushes, said cam-plate being shaped and operating upon the lever to open the circuit at the lever-contact only while the brush-contacts are in electrical contact, substantially as described.

3. In an electric controller, the combination with a suitable base, of a contact-board supported thereby provided with three rows or series of parallel contacts arranged at intervals apart to extend transversely of said contact-board, a sliding carriage supported from said base and provided with a series of contact-brushes adapted to slide over said contact-board and to be brought into register with the several series of contacts thereon, a cam-plate carried by said carriage provided with a series of cam depressions severally corresponding to the several series of contacts of the contact-board, a yielding spring-arm supported from said base provided with a cam engaging said cam-plate and carrying at its free end a contact and a fixed contact coöperating with said lever-arm contact, substantially as described.

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