

(No Model.)

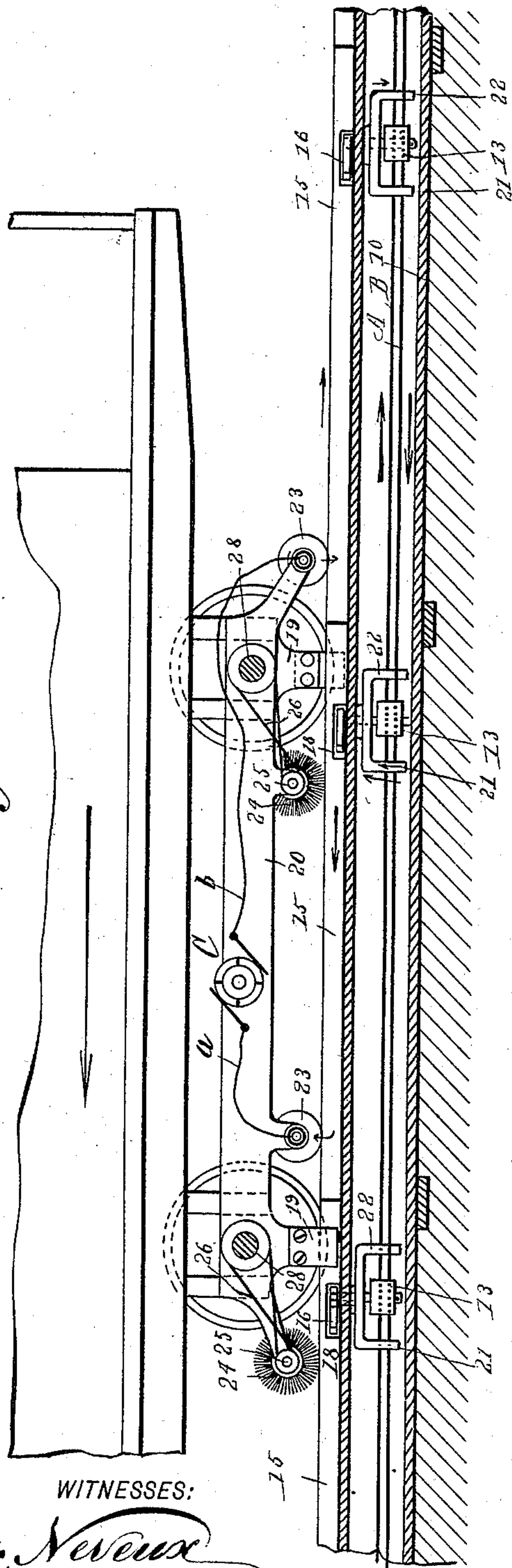
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M. F. FLYNN.  
CLOSED CONDUIT ELECTRIC RAILWAY.

No. 540,305.

Patented June 4, 1895.

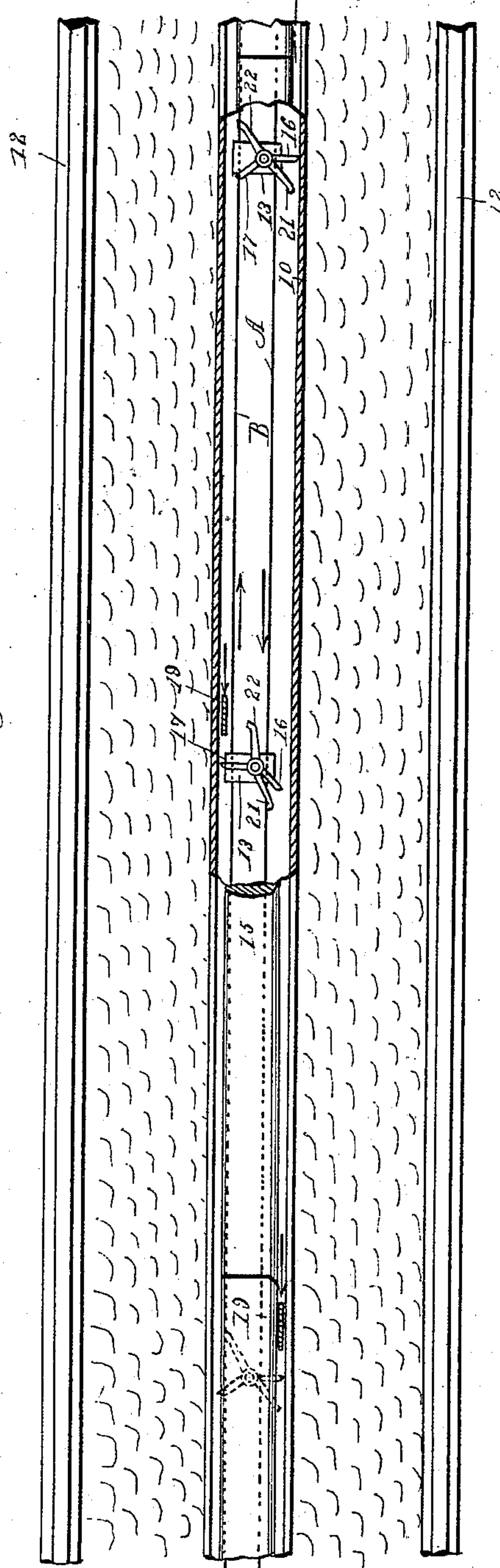
Fig. 1



WITNESSES:

C. Neveu  
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Fig. 2



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M. F. Flynn

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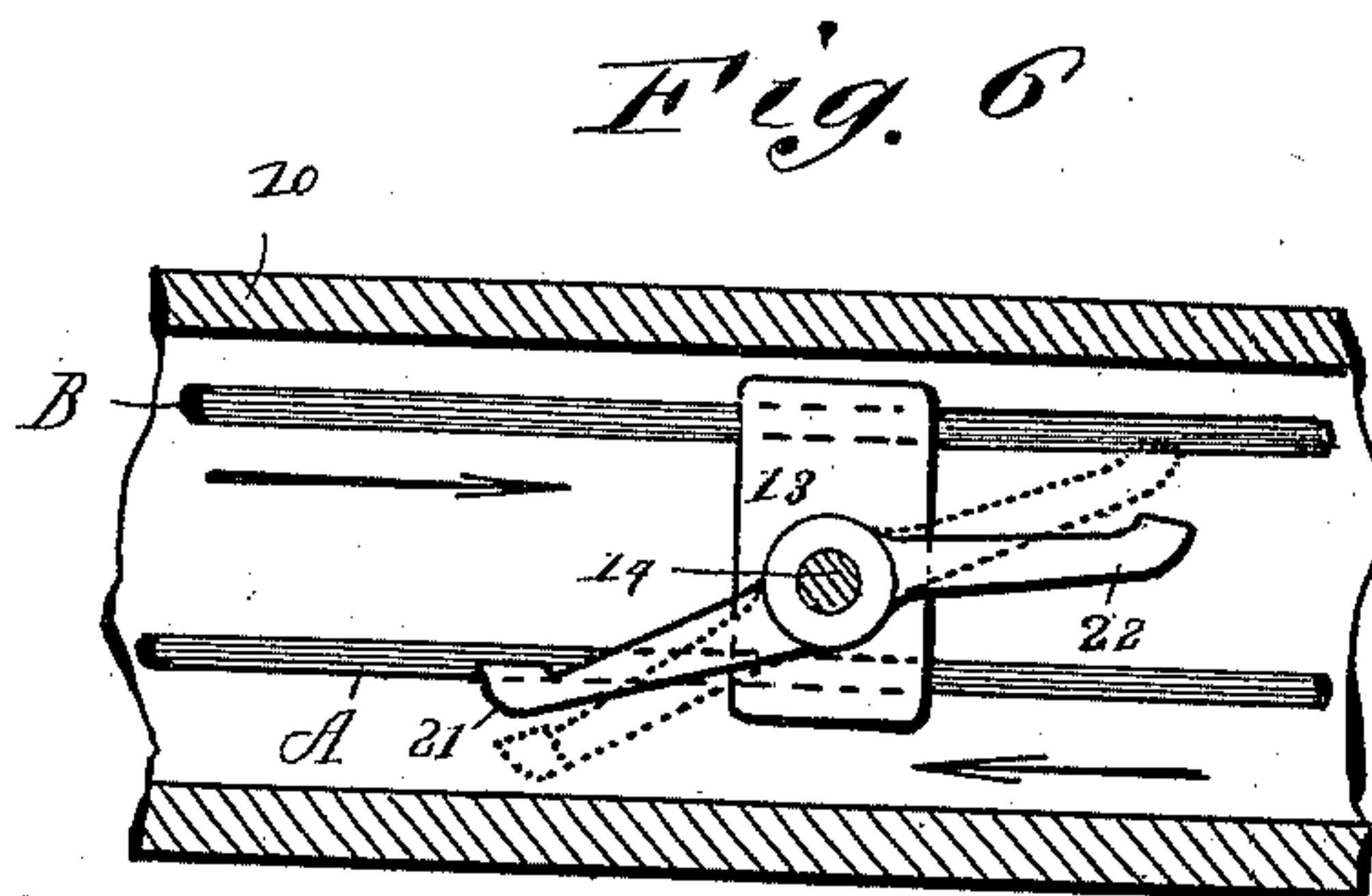
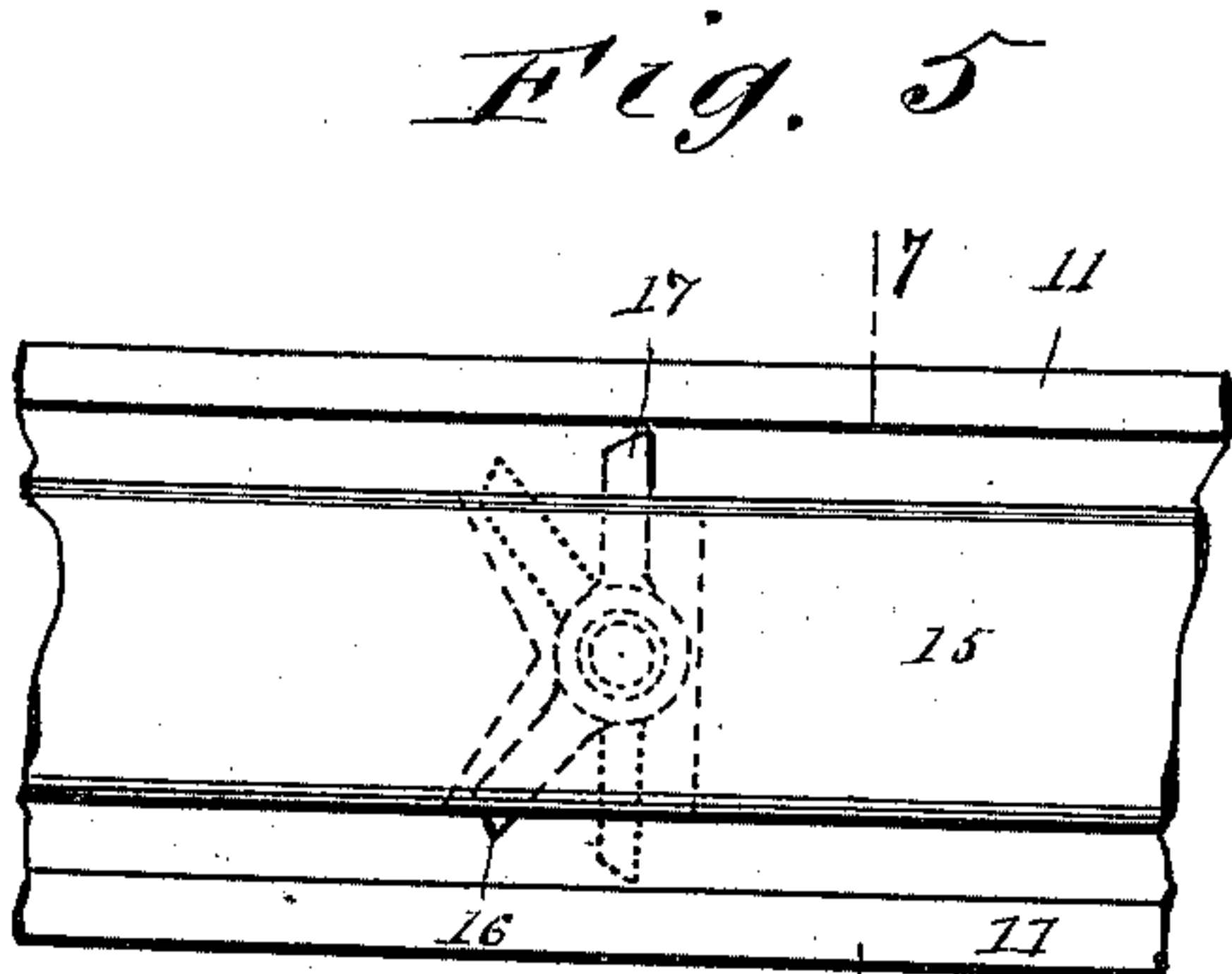
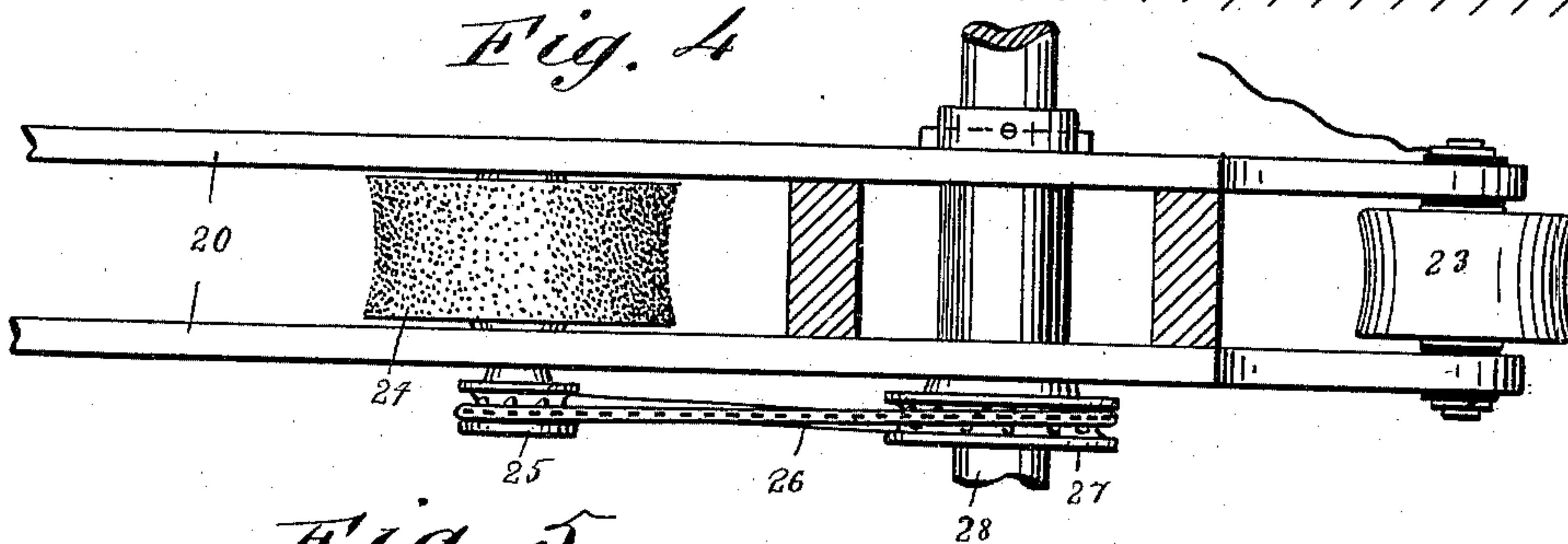
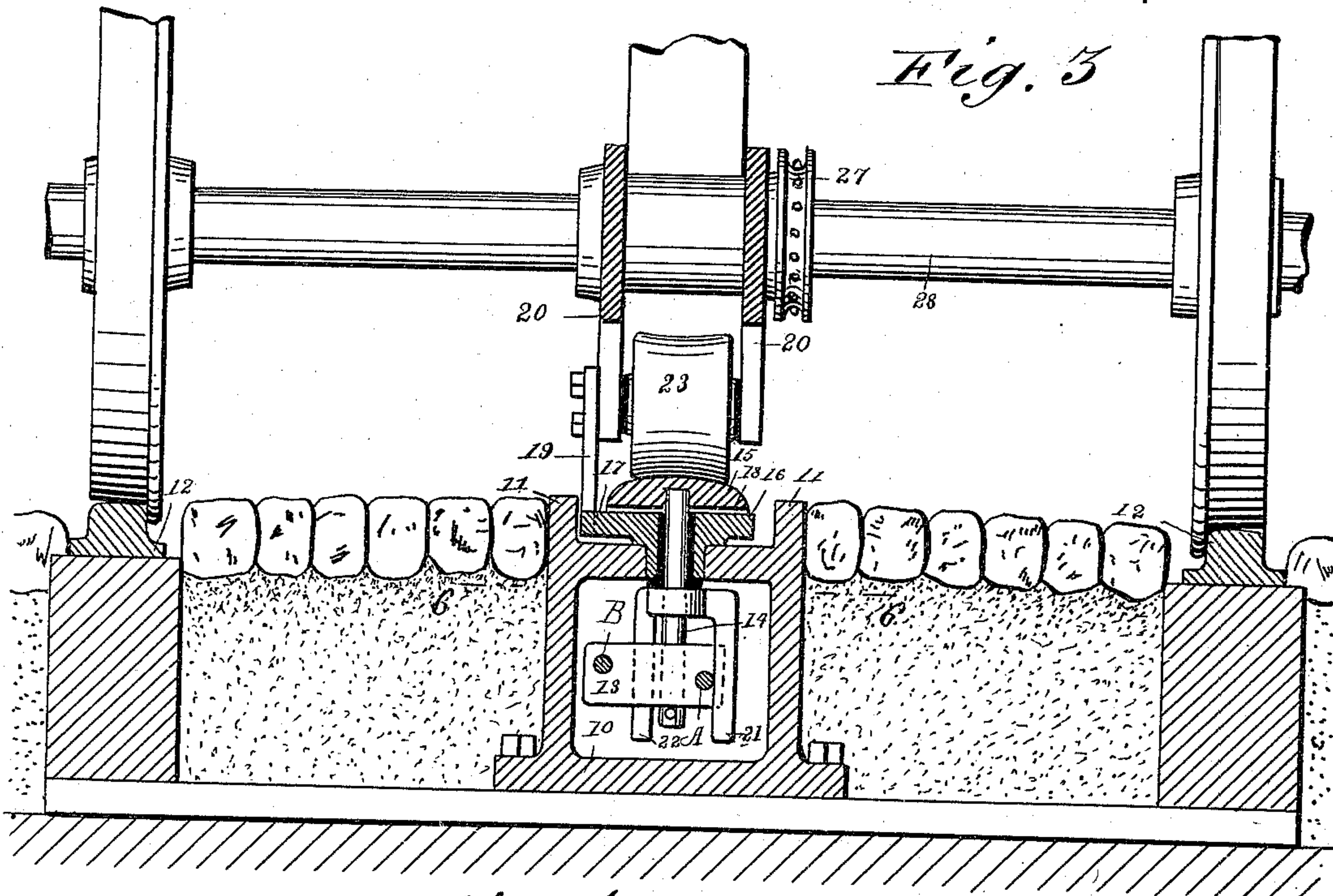
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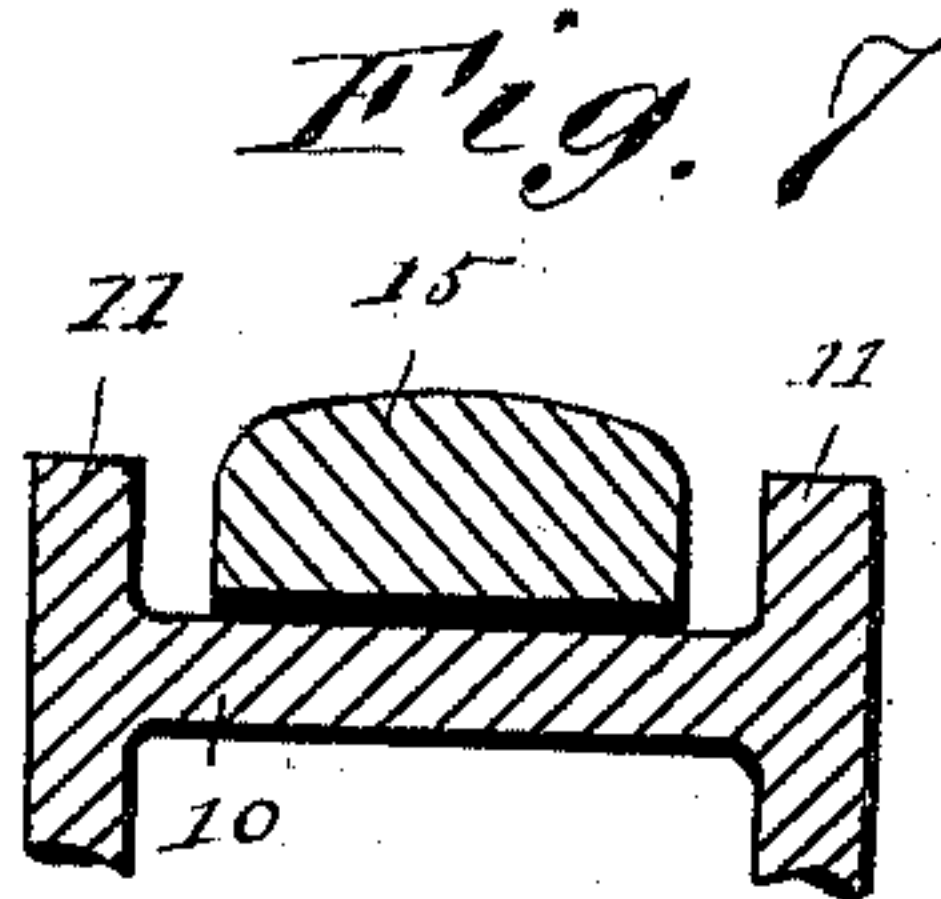
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WITNESSES:

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# UNITED STATES PATENT OFFICE.

MICHAEL F. FLYNN, OF STAMFORD, CONNECTICUT.

## CLOSED-CONDUIT ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 540,305, dated June 4, 1895.

Application filed July 28, 1894. Serial No. 518,798. (No model.)

*To all whom it may concern:*

Be it known that I, MICHAEL F. FLYNN, of Stamford, in the county of Fairfield and State of Connecticut, have invented a new and Improved Conduit Electric Railway, of which the following is a full, clear, and exact description.

My invention relates to improvements in electric railways and particularly to electric railways having the wires carried in a conduit; and the object of my invention is to produce a very simple and comparatively inexpensive railway having the live wires, both supply and return, held in a closed conduit; to provide a contact rail which a trolley on the car may easily follow, to produce a very simple automatic switch mechanism by which the current is supplied only to that part of the contact rail which is immediately beneath the car, thus rendering the line safe under normal conditions and preventing loss of current; also to produce a simple means for keeping the line clean, and in general to produce a system which will operate perfectly and with little expense.

To these ends my invention consists of certain features of construction and combinations of parts, which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures and letters of reference indicate corresponding parts in all the views.

Figure 1 is a longitudinal section on the line 1 1 of Fig. 2, showing my improved construction of conduit and the means for connecting with a car. Fig. 2 is a broken sectional plan of the conduit, showing, also, the switching mechanism for sending the current through the motor on the car. Fig. 3 is an enlarged cross-section through the conduit and the trolley on the car. Fig. 4 is a sectional plan of the trolley. Fig. 5 is a broken plan view of the contact and contact-rail. Fig. 6 is a sectional plan of the conduit and shows in detail the switching mechanism, and Fig. 7 is a broken cross-section on the line 7 7 of Fig. 5.

The conduit 10 is in the form of a casting and is preferably of a generally rectangular shape in cross section and has its side walls

11 projecting slightly above its top so as to form guides for the switch shifting plows, as hereinafter described. The conduit is arranged preferably in the roadbed midway between the track rails, and it carries the supply and return wires A and B which are supported in insulators 13, these being hung on shafts 14 which extend through the conduit top, the joint being made water-tight, and they enter the contact rail 15 which is made up of sections insulated from each other, as shown in Figs. 1 and 2, and the several rods 14 are journaled in the conduit top and are provided with switch arms 16 and 17 which turn in recesses 18 in the rail 15 and project outward from the sides of the rail between it and the flanges 11 of the conduit, so as to be struck by the plows 19 of the trolley 20 which consists of a framework, of any suitable form, secured to the axles of the car, and when the plows strike the switch arms they turn the rods 14 and the contact arms carried by them in the conduit.

The plows 19 are made preferably of hardened steel and are detachably secured to the frame 20 of the trolley, so that they may be easily renewed, and the plows run between the rail 15 and the guide flanges 11. The rods 14 carry arms 21 and 22 which are held within the conduit and which are adapted to contact respectively with the wires A and B; the arm 21 of one switch being in contact with the wire A and the arm 22 of the next switch behind it being, at the same time, in contact with the wire B, so that the circuit will pass from one switch through the car motor and to the return wire, as hereinafter described.

The trolley is provided with contact wheels 23 which run on the contact rail 15, and one of these wheels connect by a wire *a* with the motor C while the other connects with the motor by a wire *b*. See Fig. 1. The trolley is also provided with revoluble brushes 24 which run on the contact rail ahead of the contact wheels and so clean the rail to insure perfect contact, each brush being provided with a driving wheel 25 connecting by a chain 26 with a sprocket wheel 27 on the axle 28 of the car, but the brush may be driven in any suitable way.

The operation of the railway and the mechanism is as follows: The contact arm 21 of



one switch is in engagement with the wire A at the same time that the arm 22 of the next switch behind is in contact with the wire B and at the same time the arm 17 from the forward switch will project into the path of the rear plow 19 on the trolley, while the arm 16 of the rear switch will project from the opposite side of the contact rail, as shown clearly in Fig. 2. The current will then pass from the wire A, through the forward contact, the arm 21, the rod 14, the contact rail, the forward trolley wheel 23, the wire *a*, the motor, the wire *b*, the rear trolley wheel, and the rear switch to the wire B. As the car advances, the forward plow strikes the arm 16 of the next switch ahead and shifts the switch so that its arm 21 will contact with the wire A, while the rear plow 19 strikes the arm 17 of the switch which is in contact with the wire B and thus breaks the circuit through that part of the contact rail over which the car has just passed.

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

1. An electric railway, comprising a closed conduit having supply and return wires therein, a contact rail on the conduit, a trolley mounted on the car and arranged to run on the contact rail, switches at intervals on the contact rail, adapted to connect with the supply and return wires, and mechanism carried by the trolley to successively close and open the switches to the supply wire, substantially as described.

2. The combination, with the conduit, the sectional contact rail and the supply and return wires in the conduit, of the switches suspended from the contact rail and provided with arms adapted to alternately contact with

the supply and return wires, and a second set of arms on each switch projecting from the sides of the contact rail, substantially as described.

3. The combination, with the conduit having a closed top, the contact rail thereon, the return wires in the conduit and the switch adapted when actuated to throw the contact rail into and out of circuit and having arms projecting from the sides of the contact rail above the closed top of the conduit, of the trolley arranged to run on the contact rail, and the detachable plows secured to the trolley and adapted to strike the switch arms, substantially as described.

4. The combination of a conduit, a contact rail thereon, lead and return conductors in the conduit a shaft arranged in the conduit with its upper end in circuit with the contact rail, contact arms on said shaft adapted to contact with the respective conductors, and switch arms projecting from the upper end of said shaft on opposite sides of the contact rail, substantially as set forth.

5. The combination, with the conduit and the sectional contact rail thereon, of the shafts suspended from the contact rail and extending into the conduit, insulators on the shaft, supply and return wires supported on the insulators, contact arms carried by the shaft and adapted to alternately engage the supply and return wires, and working arms secured to the shaft above the conduit and arranged to project alternately from the sides of the contact rail, substantially as described.

MICHAEL F. FLYNN.

Witnesses:

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LOUIS J. CURTIS.