

No. 705,373.

Patented July 22, 1902.

W. BEHRENS & J. P. TIHON.  
ELECTRIC RAILWAY.

(Application filed Oct. 10, 1901.)

(No Model.)

2 Sheets—Sheet I.

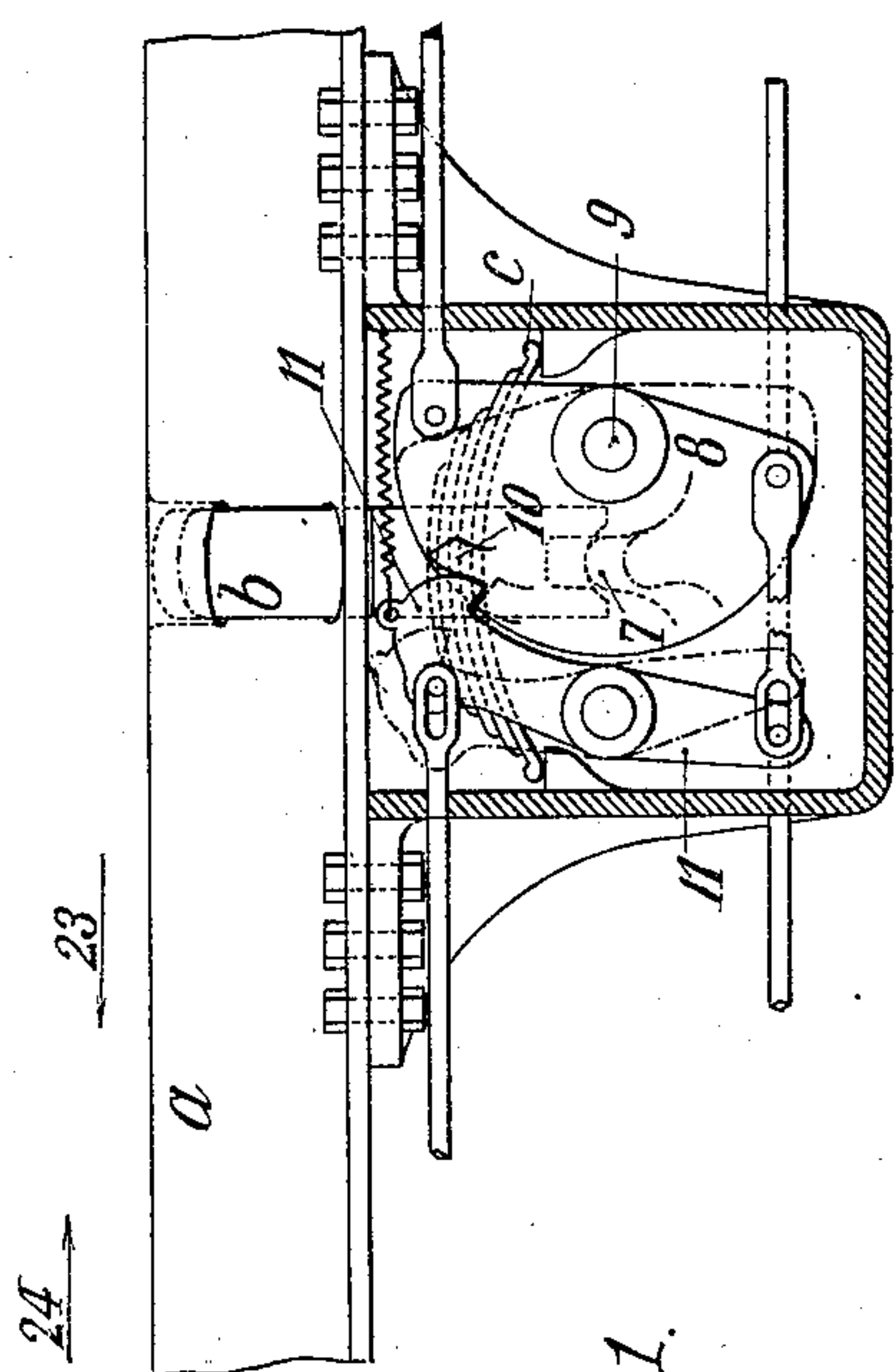


Fig. 1.

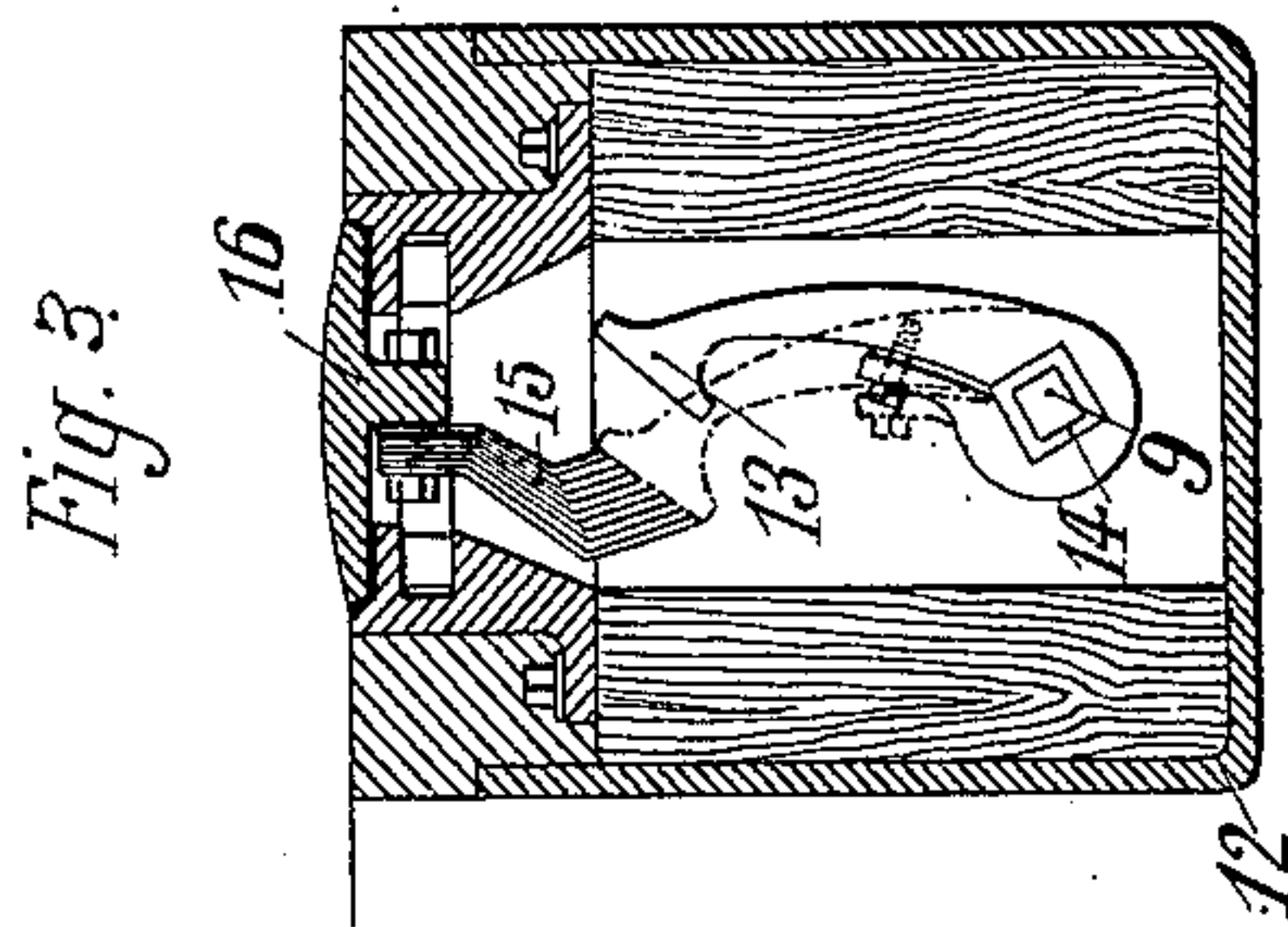
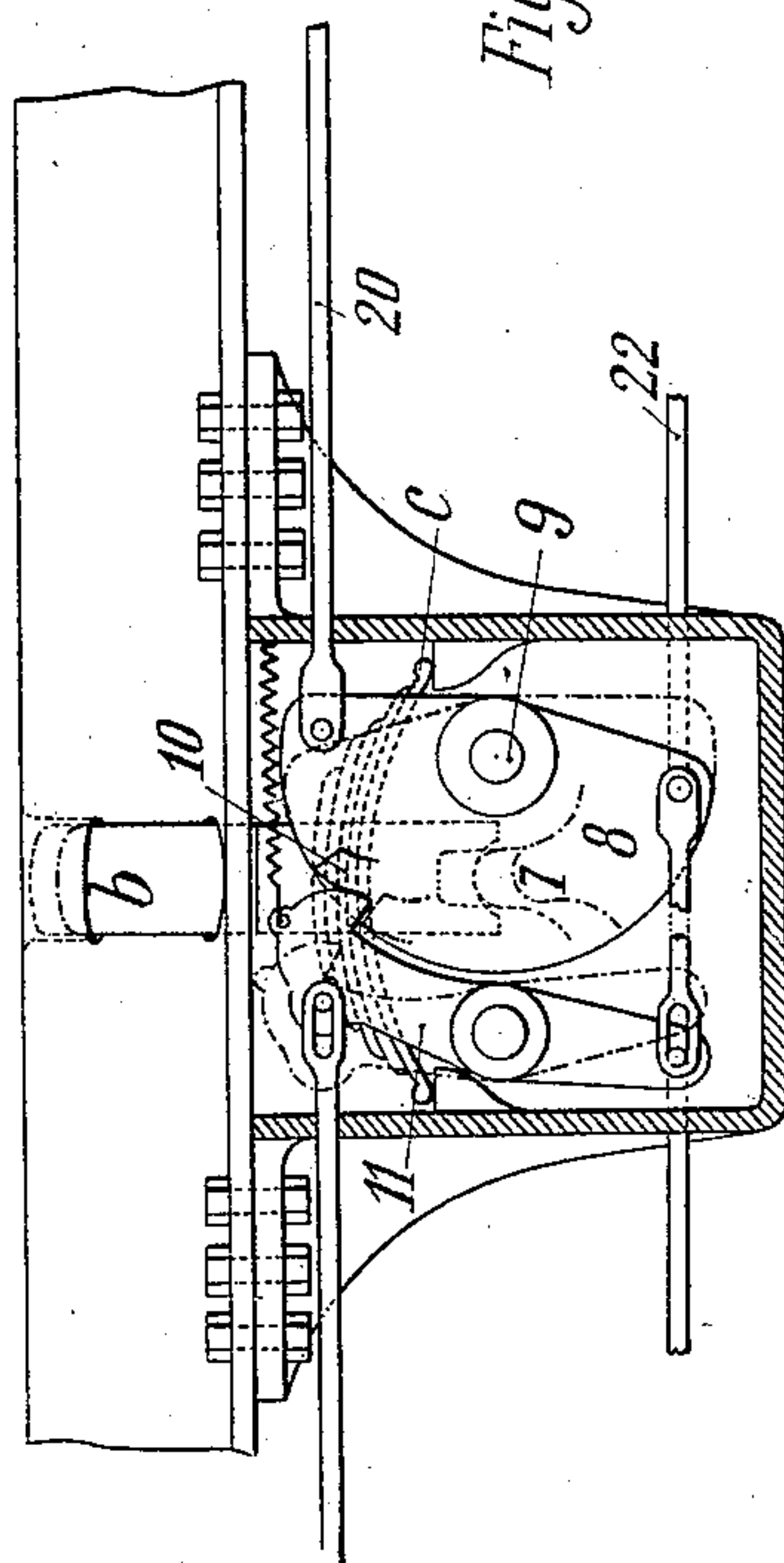


Fig. 3.

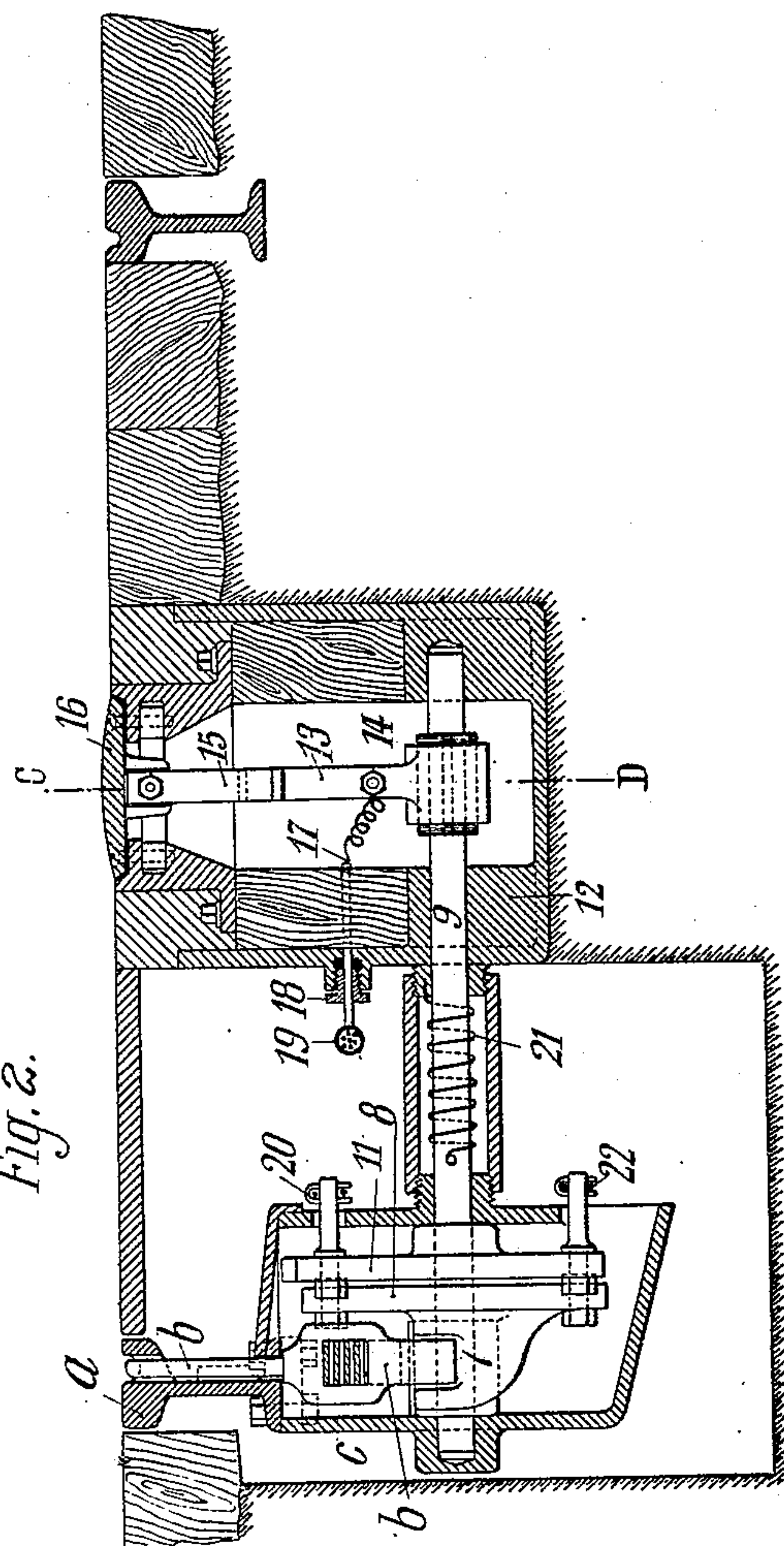


Fig. 2.

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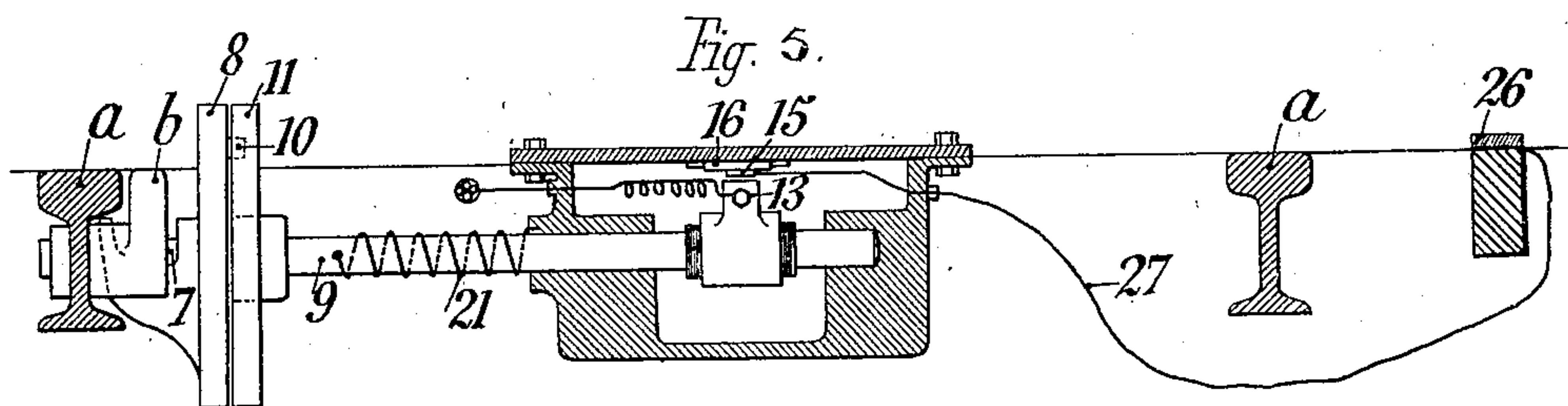
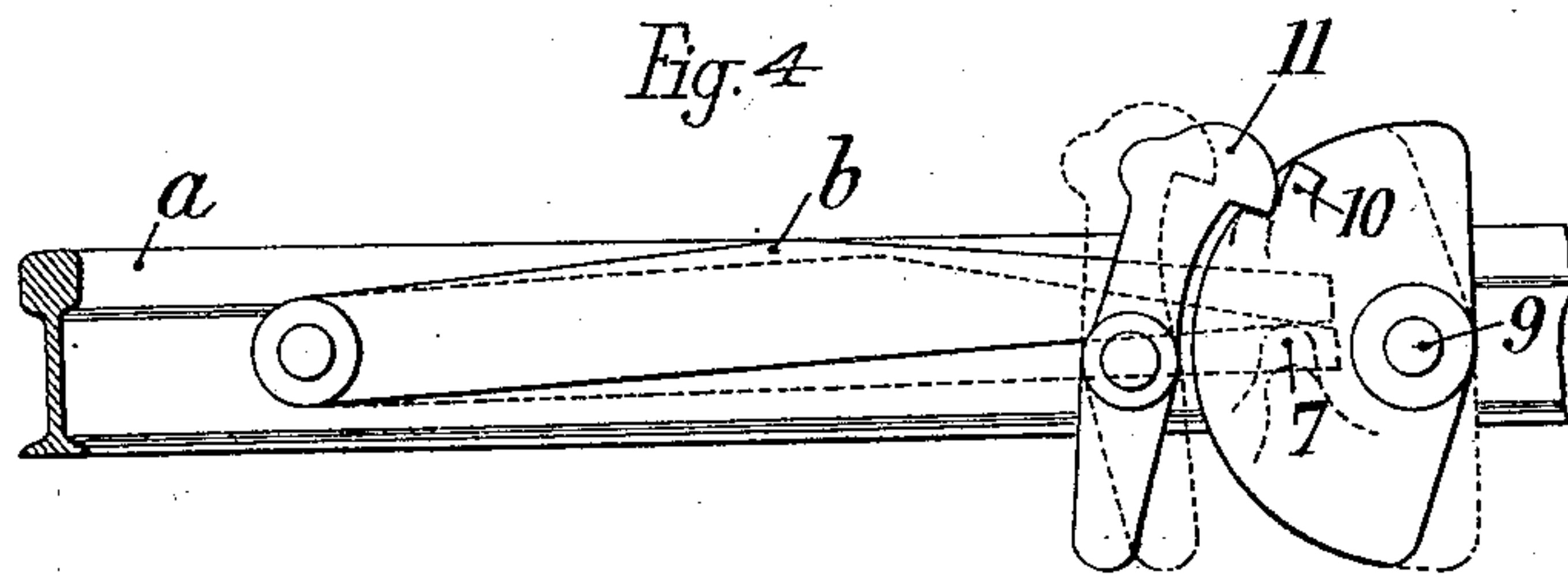
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2 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE.

WALTER BEHRENS AND JEAN PIERRE TIHON, OF PARIS, FRANCE.

## ELECTRIC RAILWAY.

SPECIFICATION forming part of Letters Patent No. 705,373, dated July 22, 1902.

Application filed October 10, 1901. Serial No. 78,247. (No model.)

*To all whom it may concern:*

Be it known that we, WALTER BEHRENS, a subject of the King of England, and JEAN PIERRE TIHON, a citizen of the Republic of France, engineers, both residing at 119 Rue Réaumur, Paris, France, have invented certain new and useful Improvements in Electric Railways, of which the following is a full, clear, and exact specification.

10 This invention relates to an arrangement for collecting current for railways and tramways operated by electric traction.

Our invention, which enables us to dispense with the continuous third rail for collecting current, which is so cumbersome and dangerous, consists, essentially, in a peculiar method of operating and engaging a commutator, enabling fixed or movable blocks or strips to be placed automatically in circuit by the vehicle, which blocks are suitably distributed over the track and serve as current-conveyers from which the current is collected by means of a palette or any other suitable part attached to the said vehicle.

25 As an example we have shown two ways of carrying out our invention.

Figures 1 and 2 are respectively a longitudinal sectional elevation and transverse sectional elevation of one form of construction of our invention, while Fig. 3 is a section on the line C D of Fig. 2. In this example a pedal *b*, which stands under the control of a strong spring *c*, operates a cam disk or plate 8, pivoted on a shaft 9, arranged under the track and carrying a contact-breaker 13, Figs. 2 and 3. The pedal, which is constantly maintained elevated to the level of the rail *a* by means of a spring *c*, is terminated for this object at its lower end by a fork, by which it 40 bears on a stirrup 7, carried by the cam-disk 8. Owing to the eccentricity of the stirrup 7, the depressing of the pedal causes a rotary movement from left to right of the disk 8. This latter has on the face opposite to that of the stirrup a little heel-piece or notch 10, which then engages under a pawl 11, rendering the disk thus immovable and preventing its backward return under the action of a spring 21, Fig. 2, which tends constantly to 50 cause the shaft 9 to revolve from left to right. The pedal *b* may under the action of the

spring *c* return to its normal position without carrying the disk with it.

A box 12, in which is contained and revolves the part of the shaft 9 which carries the contact-breaker 13, is arranged opposite each pedal. This contact-breaker is mounted on the said shaft by means of an insulated sleeve 14. A plug 16 forms a block for collecting current and carries for this object a contact 15, formed of strips. The circuit-breaker 13 is connected by a flexible conductor 17, passing through a tight joint 18, with the conducting-cable 19, which extends along the whole length of the track. When the contact-breaker 13 encounters the contact 15, the block 16 is placed in circuit and can convey current to a car passing over it. The plug or block 16 may be electrically connected with one or more adjacent blocks, which thus receive current and become free of current simultaneously with it. The passage of a wheel over the pedal *b* places the block 16 in circuit. Owing to the disk 8 being rendered stationary by the engagement of the notch 10 with the pawl 11, which engagement may be insured by means of a spring 25, the said block remains in circuit until the vehicle passes on to the next pedal. In fact, supposing the car to be traveling in the direction indicated by the arrow 23, when the second pedal *b* will be actuated, the rotation of the corresponding disk 8 will give rise to a traction toward the left on the rod 20, which connects the upper part of the disk or pawl 11 with the preceding box. This pawl releases the notch 10 and allows the disk 8 of the first pedal to return to its normal position under the action of a spring 21, acting on the shaft 9. Immediately the block 16 belonging to any pedal is placed in circuit the block corresponding to the preceding pedal is thrown out of circuit. In any case in practice, owing to the inertia of the parts, the placing in circuit of any block 16 always slightly precedes the throwing out of circuit of the preceding block 16, which insures the prevention of sparking resulting from the breakage of the circuit.

If the vehicle be supposed to be traveling in the reverse direction—i. e., in the direction indicated by the arrow 24—the operation



of any pedal *b* produces a rotation of the corresponding disk 8. The latter in revolving exerts a traction on the metallic rod 22, which connects with an arm carried by a lower prolongation of the pawl 11. The result is that the placing in circuit of any block 16 then produces the placing out of circuit of the left-hand block 16 immediately preceding.

Figs. 4 and 5 are respectively a longitudinal elevation and transverse section of a modification of the arrangement just described to allow of its application to a railway-track. In this case the various parts are not necessarily buried underground, and the current instead of being taken directly by plugs 16, forming blocks, is taken by non-continuous conducting strips or bands 26, arranged along the track, the various consecutive bands being connected with a corresponding contact 13 15 16 by a conductor 27.

It will be noticed that the arrangement hereinbefore described completely avoids the dangers and complexity involved by the use of a third rail maintained in circuit along its entire length. The pedals *b* under the action of a powerful spring cannot be depressed except under the action of the considerable

weight of the vehicle and by the flange of the wheel penetrating into the groove of the rail. No unauthorized formation of circuit is therefore to be feared.

We declare that what we claim is—

An arrangement for collecting current for electric railways comprising a plurality of depressible spring-pedals *b*, contact-breaking commutators, shafts 9 carrying the same, disks mounted on said shafts and adapted to be operated by said pedals, a two-armed spring-pressed lever having a projection or pawl at one end adapted to engage each disk, a connection from one arm of each lever to the preceding disk and a connection from the other arm to the succeeding disk whereby the placing in circuit of one commutator involves the placing out of circuit of the preceding and succeeding commutators, substantially as described.

In witness whereof we have hereunto set our hands in presence of two witnesses.

WALTER BEHRENS.  
JEAN PIERRE TIHON.

Witnesses:

EMILE BERTU,  
EDWARD P. MACLEAN.