

No. 682,540.

Patented Sept. 10, 1901.

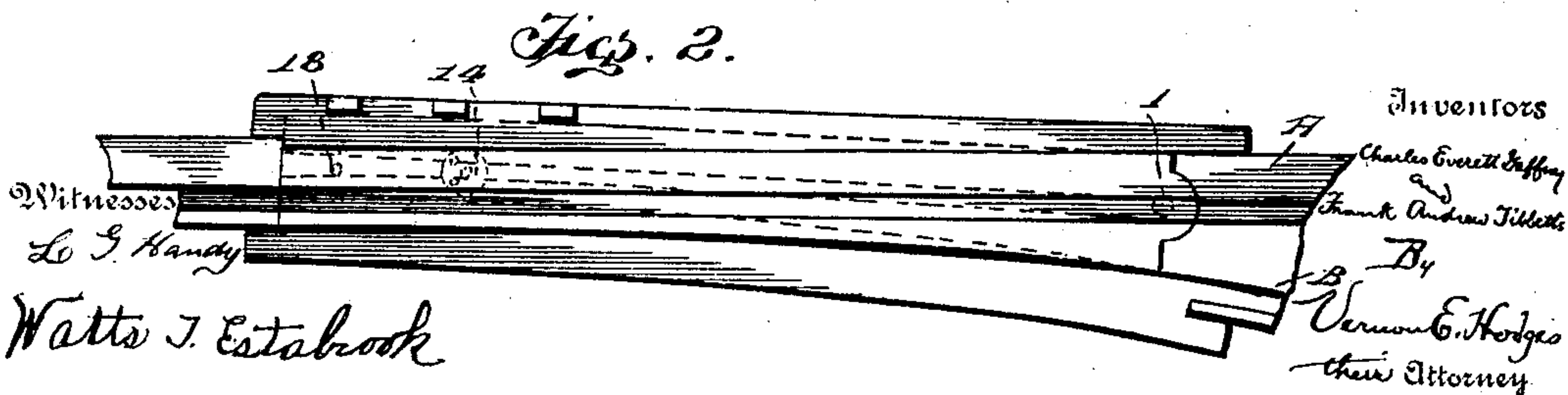
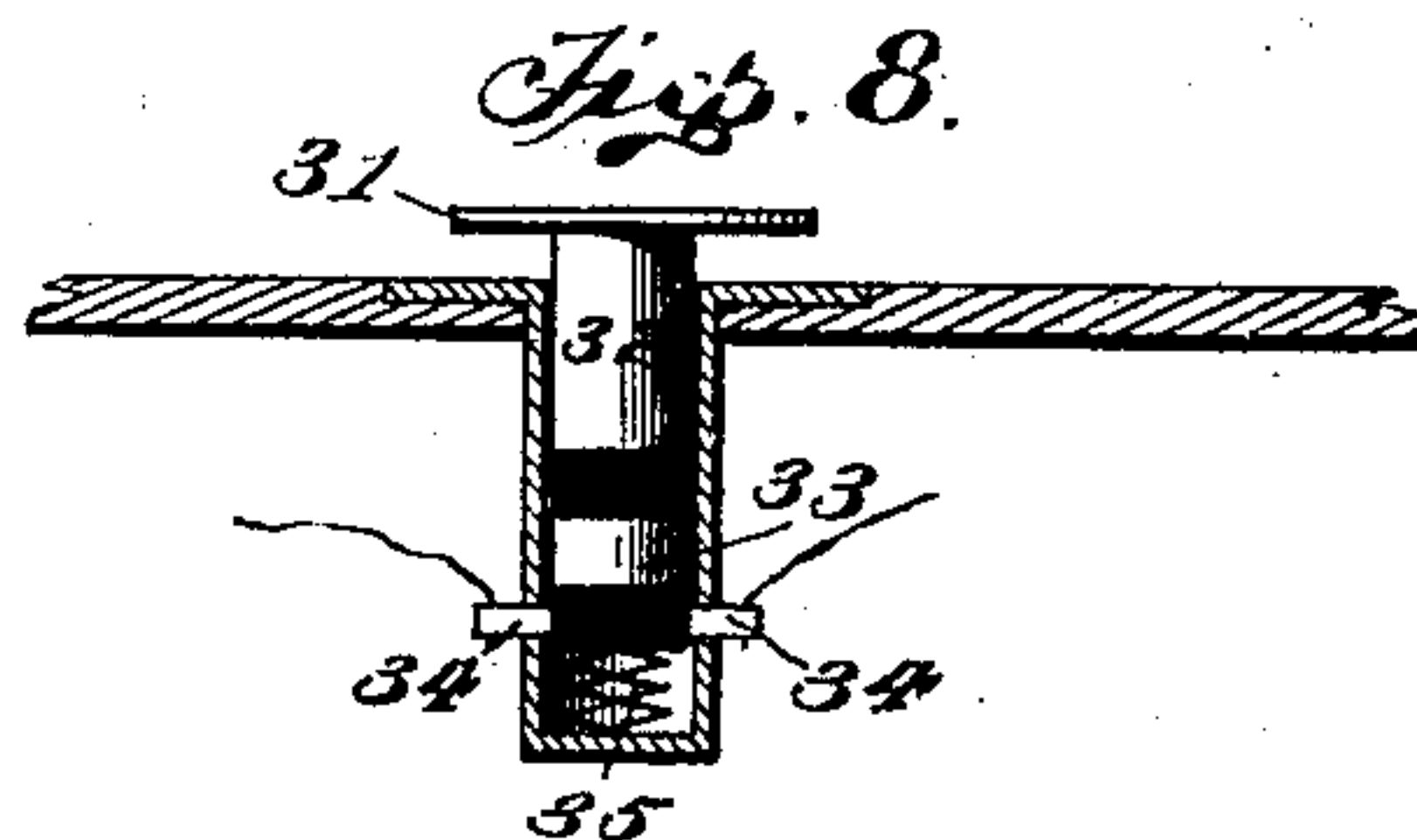
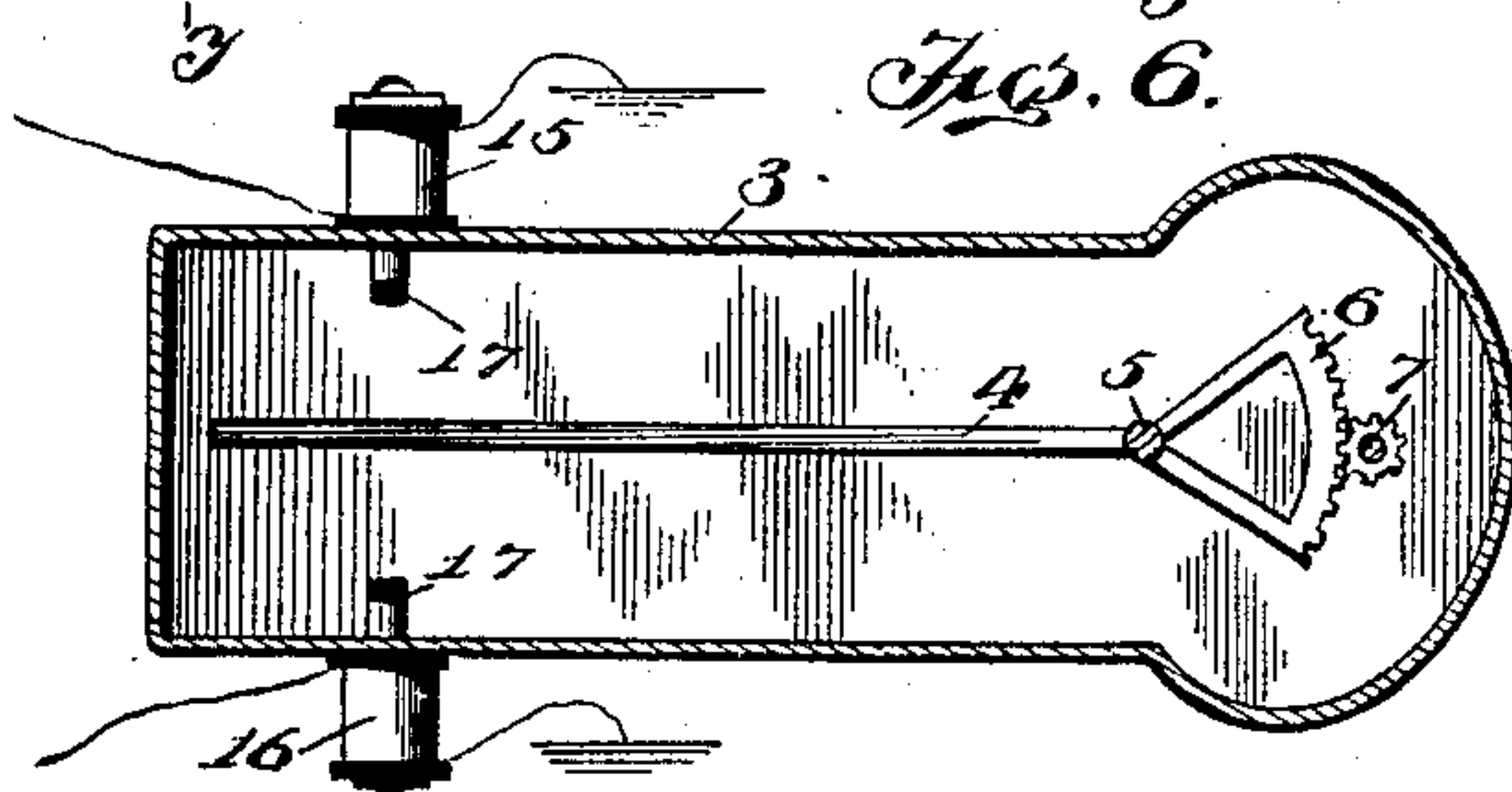
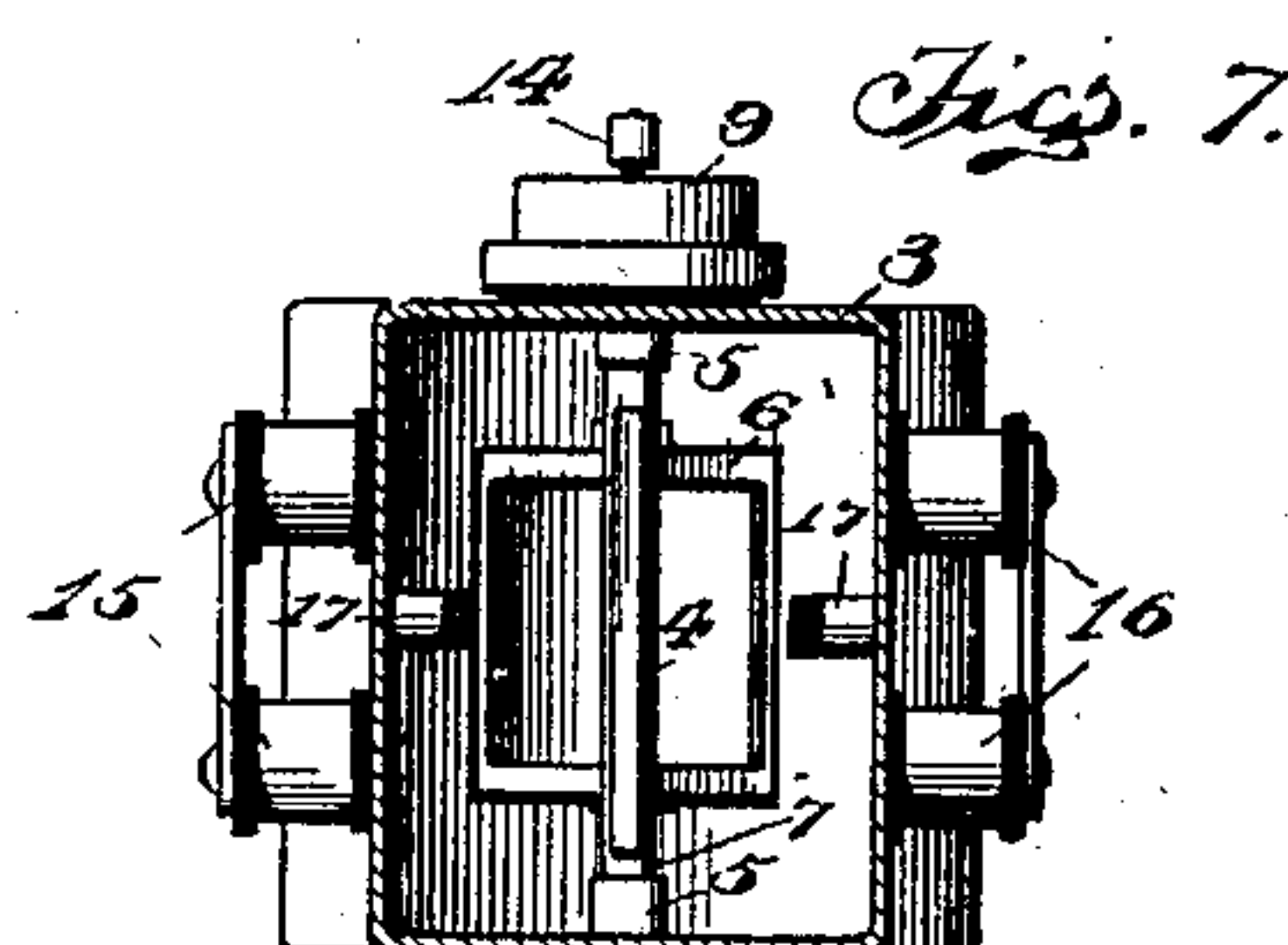
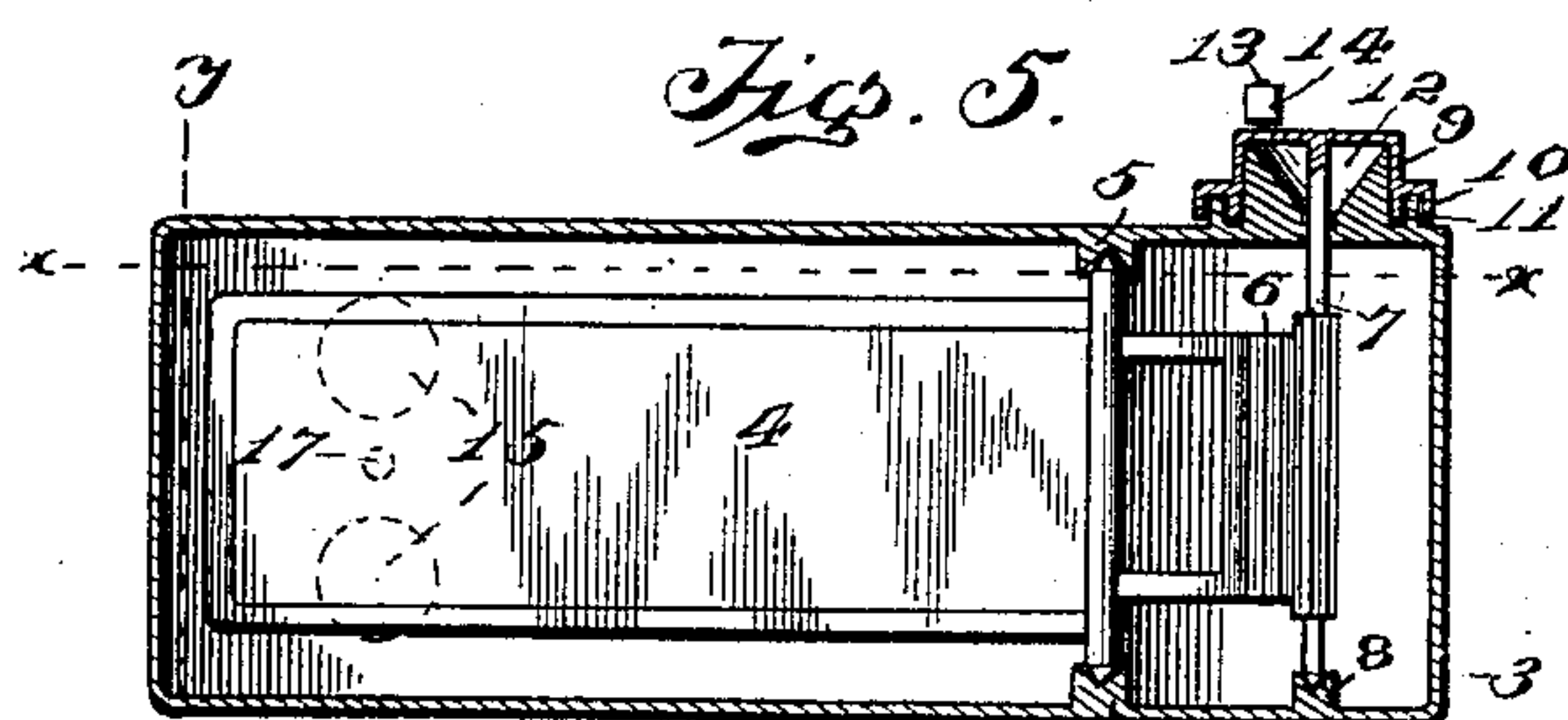
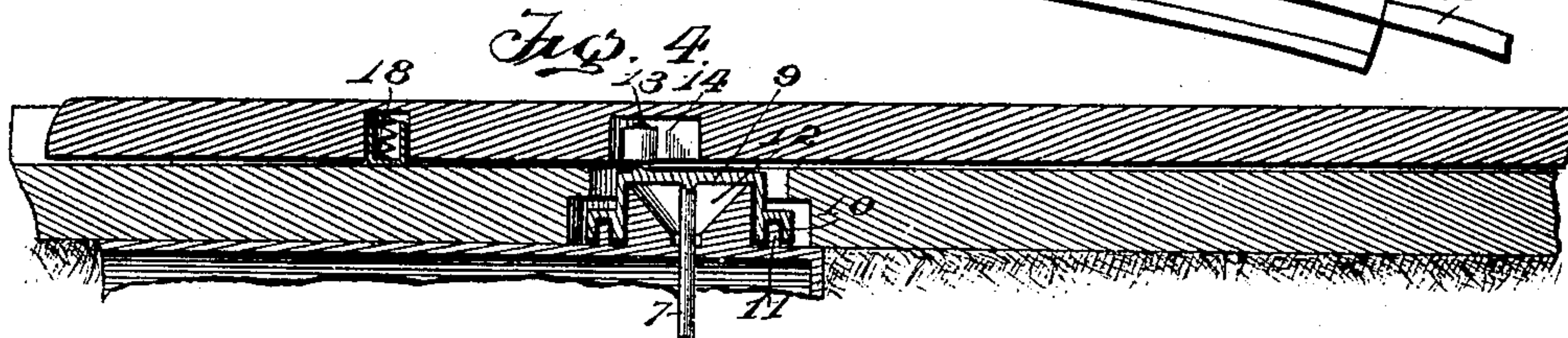
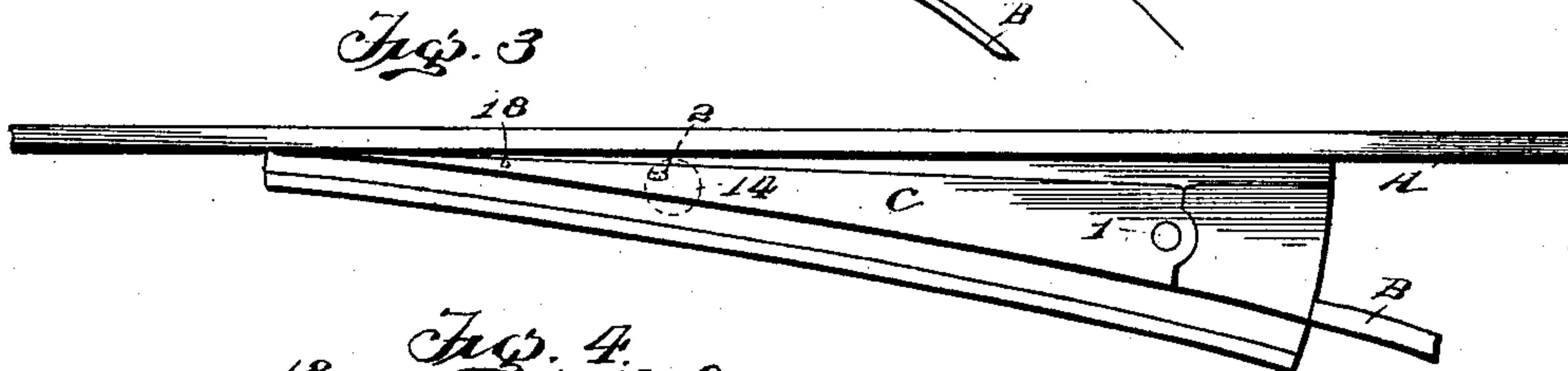
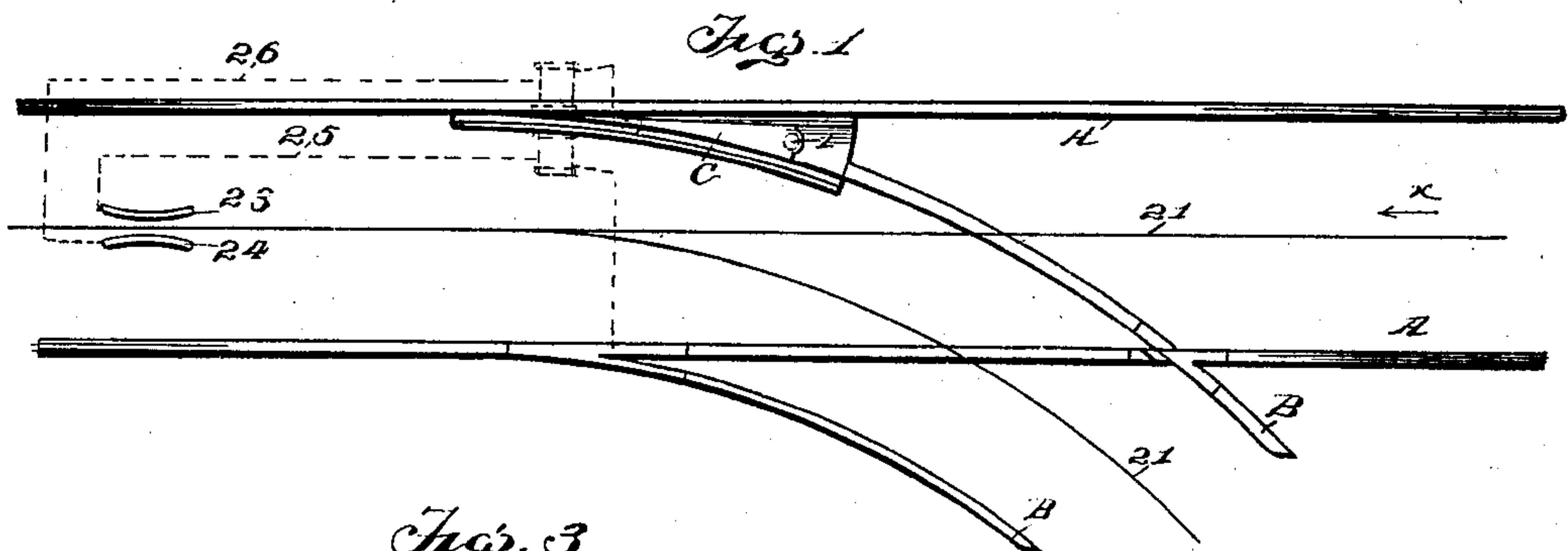
C. E. GAFFNEY & F. A. TIBBETTS.

ELECTRIC SWITCH.

(Application filed May 20, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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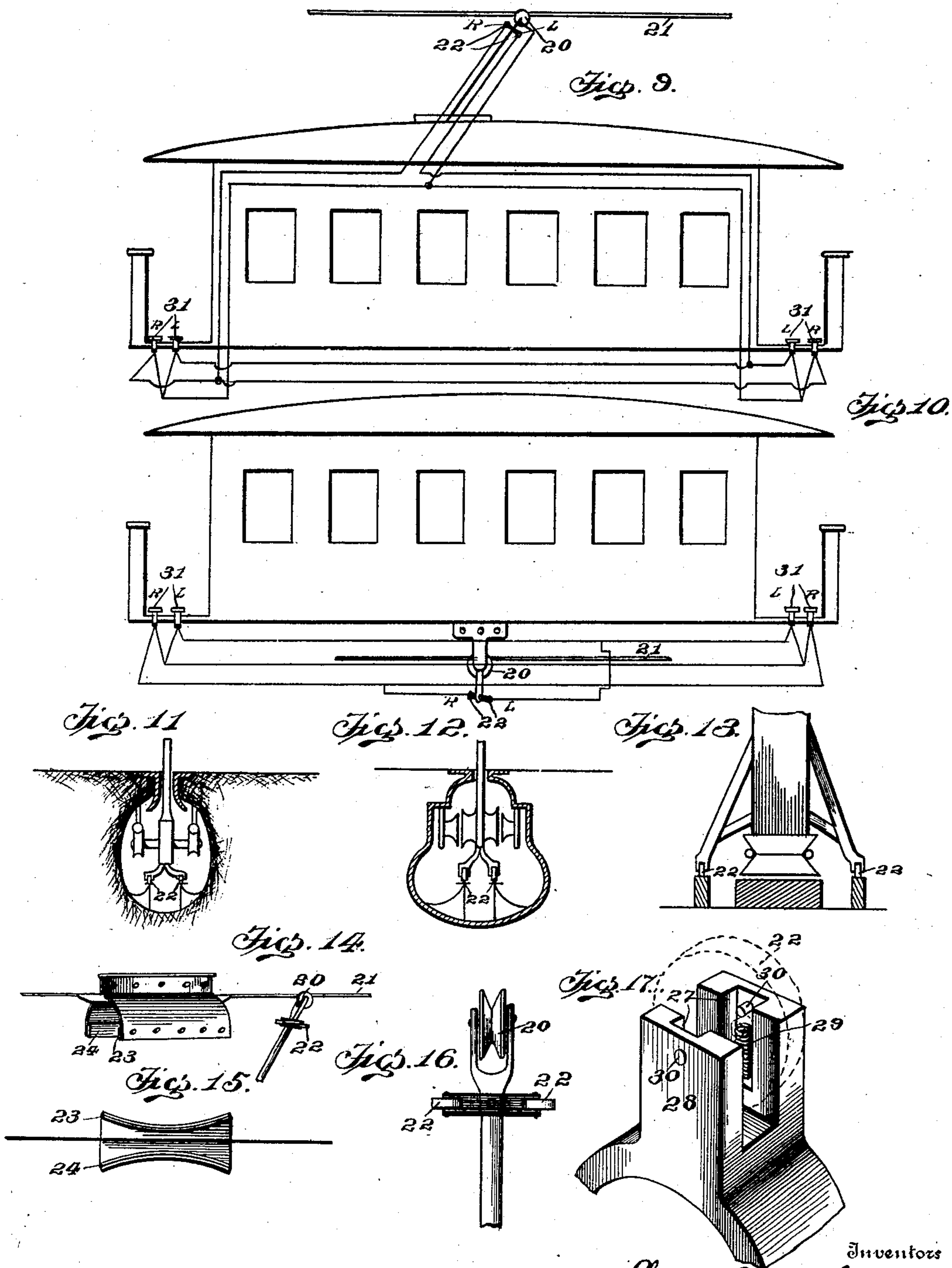
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UNITED STATES PATENT OFFICE.

CHARLES EVERETT GAFFNEY, OF PAWTUCKET, AND FRANK ANDREW
TIBBETTS, OF PROVIDENCE, RHODE ISLAND.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 682,540, dated September 10, 1901.

Application filed May 20, 1901. Serial No. 61,172. (No model.)

To all whom it may concern:

Be it known that we, CHARLES EVERETT GAFFNEY, residing at Pawtucket, and FRANK ANDREW TIBBETTS, residing at Providence, in the county of Providence and State of Rhode Island, citizens of the United States of America, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

Our invention relates to an improvement in electric switches for railways, and particularly to devices for operating those switches, one object of importance being a new switch-tongue, another being to provide mechanism applicable to this new switch or the switch-tongues now in use and to apply the operating mechanism at or near the free end thereof, so that a minimum of power will exercise a maximum pressure upon the pivoted tongue to shift it one way or the other.

Another object is to make the invention applicable to overhead or underground trolley systems or the third-rail system by a simple readjustment of trolley and connection plates.

With the foregoing and other objects in view our invention consists in certain novel features of construction and combinations of parts, which will be more fully described hereinafter, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view showing main track, switch, pivoted tongue, and conductor-wires. Fig. 2 is an enlarged plan view of the new tongue, showing the position of eccentric for operating it. Fig. 3 shows application to tongues in use. Fig. 4 is an enlarged detail in vertical section through the pivoted tongue. Figs. 5, 6, and 7 are views of the shifting mechanism. Fig. 8 is a view in section, showing the removable foot-pin and contact-maker. Figs. 9 and 10 are views showing our improved switch-operating mechanism as applied to the overhead or underground trolley systems. Figs. 11, 12, and 13 show different underground and third-rail systems. Figs. 14 and 15 are side and plan views of the contact-box. Fig. 16 is a view of the trolley and secondary wheels, and Fig. 17 is an enlarged detail.

A A represent the tracks of the main line,

and B B of the switch, and the letter C indicates the pivoted tongue, which is pivoted at point 1 in the usual manner and to which is applied our improved mechanism for shifting it positively in one direction or the other, accordingly as the car is to proceed on the main line or take the switch or branch line B B. In passing it may be stated that an ordinary pivoted switch-tongue may be employed, as shown in Figs. 1 and 3, or in lieu thereof one of special construction, as shown in Fig. 2, might be used. The latter is a double-railed pivoted switch-tongue which slides on metal base or plate, but is not confined by side rails, and hence cannot become clogged by dirt or other foreign matter. On the lower side of this pivoted tongue an elongated slot 2 is formed, the same extending longitudinally of the tongue and located as near the vibratory or free end thereof as practicable. Beneath this tongue a box 3 is located, and in this box armature 4 is pivotally mounted between bearings 5 5. A toothed segment 6 on one side of the bearing is intermeshed with the teeth of bar 7, which latter is stepped at its lower end in a bearing 8 in the bottom of the box 3 and provided at its upper end with a cap 9. This cap is in the form of a turn-table, and to that end is provided at the outer edge with an annular groove 10, which receives and turns upon an annular bearing-flange 11, which flange affords a uniform support for this cap at every point throughout the groove 10, thus making an even bearing and preventing vibration. A cup 12, formed at the center, is adapted to receive lubricant (either oil or grease) to keep these parts well lubricated, and the shape of the cap is such together with this oil and the downwardly-opening groove by its nature, prevents the ingress of dirt, water, or other foreign substance to the bearings. A pin 13 is eccentrically located on top of the cap, and in order to lessen friction has mounted thereon an antifriction-roller 14, which latter enters and travels back and forth in the slot 2 of the pivoted tongue, imparting a lateral motion to the tongue as a result of the circular movement of the pin and its roller about the axis of rotation.

The armature 4 is vibrated by and wholly

under the control of the two sets of electromagnets 15 and 16, one being on each side of the free or vibratory end of the armature. Rubber non-contact pads 17 17 at each side prevent the pivoted tongue from clinging to the magnets. To lessen friction and tend to slightly elevate the the outer or vibratory end of the pivoted tongue, a spring-cushioned bearing 18 is located. This spring-cushioned bearing rests and slides upon a plate beneath and is adapted to concentrate the frictional contact of the tongue, so far as possible, at its lower end, so that the power required to shift the tongue is reduced to a minimum.

The trolley-pole, whether for the overhead or the underground system, has the usual trolley-wheel 20 for engagement with the main conductor-wire 21 and the secondary wheels 22 22 at either side for contact with the secondary conductor-bands 23 and 24, which depend from the main trolley-wire 21 in the overhead system and extend a short distance apart, corresponding, substantially, to the relative positions of the secondary wheels 22 22, these secondary bands being connected each by a wire 25 26 with the magnets 15 and 16, respectively, which control the pivoted tongue. These secondary bands, of course, are insulated from the main conductor-wire 21, so that the two currents are entirely independent, and the currents flowing through the electromagnets are grounded through the rails. While these secondary wheels may be variously supported, in Figs. 16 and 17 we have illustrated a preferred construction, in which their bearings turn in grooves 27 27 in the arms 28, they being forced yieldingly outward in these grooves in contact with the secondary bands by means of springs 29 29 and confined against escape from the outer ends of these grooves by the set-screws 30 30.

The car is provided with the usual conductor-wire extending through the pole of the trolley, whether overhead or underground, for supplying the current to the motor, and in addition to this the secondary wheels 22 22 are separately wired to each end of the car where the push-buttons 31 31 are located. There are two of these push-buttons in each platform, one for each conductor-wire 25 26. These pins rest loosely in sockets formed for them and are removable therefrom to prevent unauthorized tampering with the switch, and they operate to depress a contact-making plug 32 within said sockets, said contact-maker having the metallic block 33 normally held out of engagement with the two contacts 34 34 on the conductor-wires by the spring 35, so that contact is made by depressing the pin 31 by placing the foot thereon or in any other convenient manner, and the contact is immediately broken by the withdrawal of this pressure from the pin.

In Figs. 11, 12, and 13 different underground and third-rail systems are illustrated, the constructions of which do not require de-

tail description, as they are simply exemplifications of means of making contact with the conductor-wires.

To operate the switch, the motorman simply depresses either the right or left hand foot-pin 31, accordingly as he desires to follow one track or the other, and the one depressed established a contact through the contact-maker 33 and the engagement of its metallic block 33 with the contacts 34 34, making a current through either one electromagnet 15 or 16, as the case may be, which when energized attracts the armature 4, operating to turn the pinion 7 axially and carry with it the cap 9 on its upper end, which throws the pin 13, with its antifriction-roller 14, to the right or left in the arc of a circle, which latter by its confinement with the elongated slot 2 in the pivoted tongue shifts the latter in one direction or the other. Of course when coming in the other direction from the arrows marked *x*, whether on the main line or branch, the wheels of the car force the pivoted tongue in desired direction if it requires shifting.

It is evident that slight changes might be resorted to in the form and arrangement of the several parts described without departing from the spirit and scope of our invention, and hence we do not wish to limit ourselves to the exact constructions herein set forth; but,

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

1. The combination with a pivoted tongue having an elongated slot on its lower surface, extending lengthwise of the tongue and located at or near the free or vibratory end thereof, of an eccentric having sliding connection in the said slot, a gear connected with the eccentric, a pair of electromagnets, an armature provided with a segment for operating the gear-wheel which controls the eccentric and means for energizing either magnet to shift the armature in one direction or the other.

2. The combination with a pivoted tongue having a cushioned bearing on its inner surface to reduce the frictional contact of the tongue upon its support, of an eccentric mechanism independent of the cushioned bearing for vibrating the tongue and means for turning the eccentric in one direction or the other.

3. The combination with a pivoted tongue having a cushioned bearing on its inner surface to reduce the frictional contact of the tongue upon its support, of an eccentric mechanism independent of the cushioned bearing for vibrating the tongue, an armature for turning the eccentric, electromagnets for vibrating the armature and means for energizing one magnet or the other.

4. The combination with a gear-wheel having a cap on its upper end which carries an eccentrically-located pin said cap having an annular groove on its lower surface and an oil-cup located beneath it, of an annular

flange upon which the cap turns and is supported evenly in its rotary movements, and which makes it dirt and water proof.

5 The combination with two electromagnets and means for energizing one or the other, of an armature under the control of these magnets, said armature having a segment at one end, a gear-wheel meshed with the teeth of said segment said gear-wheel
10 having a cap at its upper end which carries an eccentric-pin, said cap provided with a depending annular groove and an annular flange or track which receives this groove and upon which the cap turns, and a pivoted
15 device vibrated by the eccentric-pin.

6. The combination with a pivoted tongue, of a railroad-switch and electromagnets and armature for shifting said tongue, of a car provided with a trolley having main and secondary trolley-wheels, the latter being spring-
20 actuated, a main conductor-wire, secondary bands or contacts in circuit with the electromagnets and a contact-maker for each of said circuits.

25 7. The combination with a pivoted tongue, of a railroad-switch and electromagnets and armature for shifting said tongue, of a car provided with a trolley having main and secondary trolley-wheels, the latter being spring-

actuated, a main conductor-wire, secondary
bands or contacts in circuit with the electromagnets, a contact-maker for each of said circuits, a spring for normally breaking the circuit at the contact-maker and a removable foot-pin for operating the contact-maker. 35

8. A double-railed, pivoted switch-tongue having a single groove vibrated by armature and electromagnets, and which being without the confines of side rails, cannot become clogged by dirt or other foreign matter, and
40 eccentric mechanism for shifting the switch-tongue.

9. A trolley-arm having a main trolley-wheel and electric connections, said arm provided with oppositely - extending grooved
45 arms, secondary wheels, the bearings of which slide in said grooves, springs for normally forcing the wheels yieldingly outward and means for retaining the wheel-bearings in said groove. 50

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

CHARLES EVERETT GAFFNEY.

FRANK ANDREW TIBBETTS.

Witnesses:

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JAMES L. JENKS.