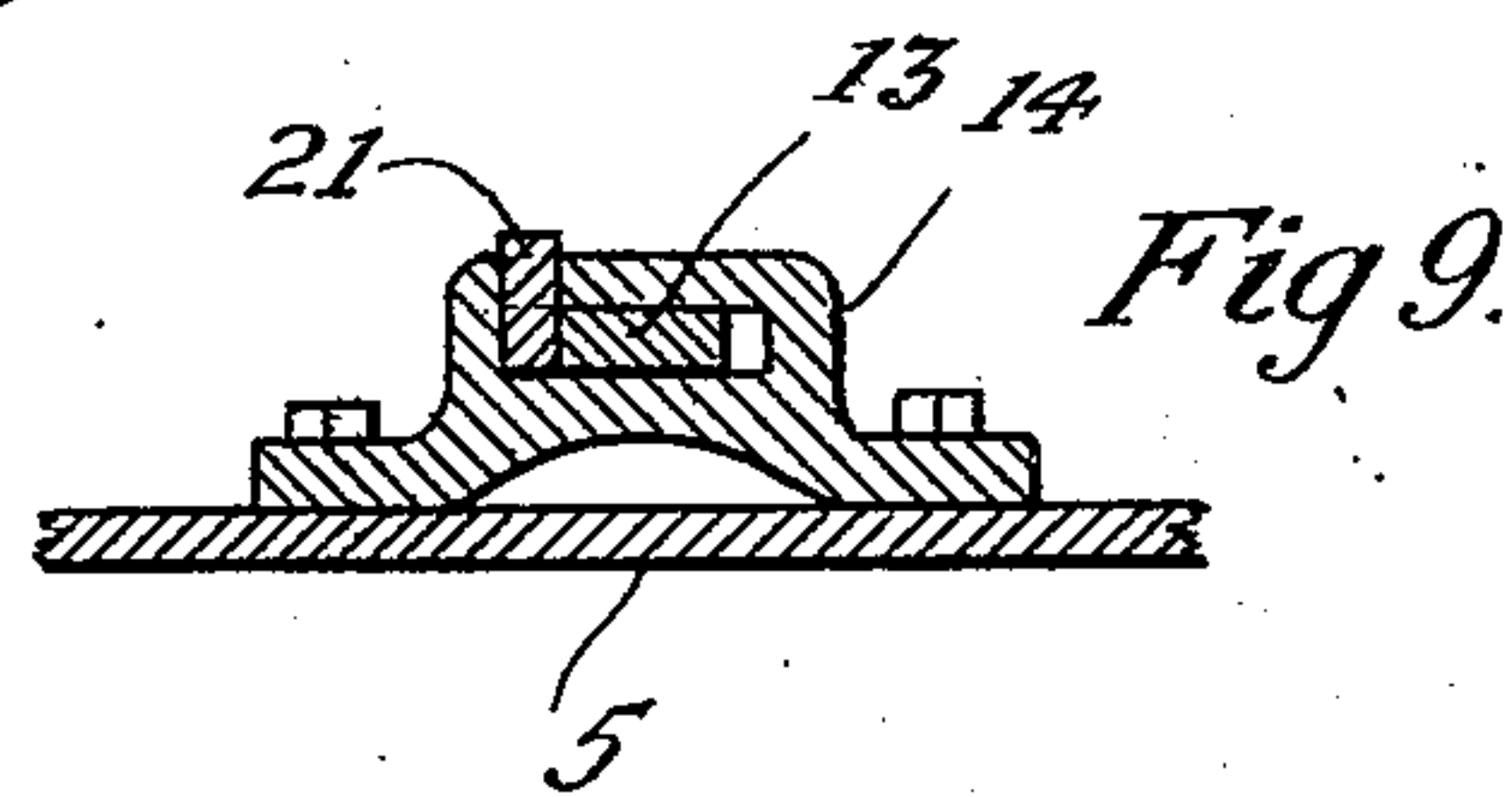
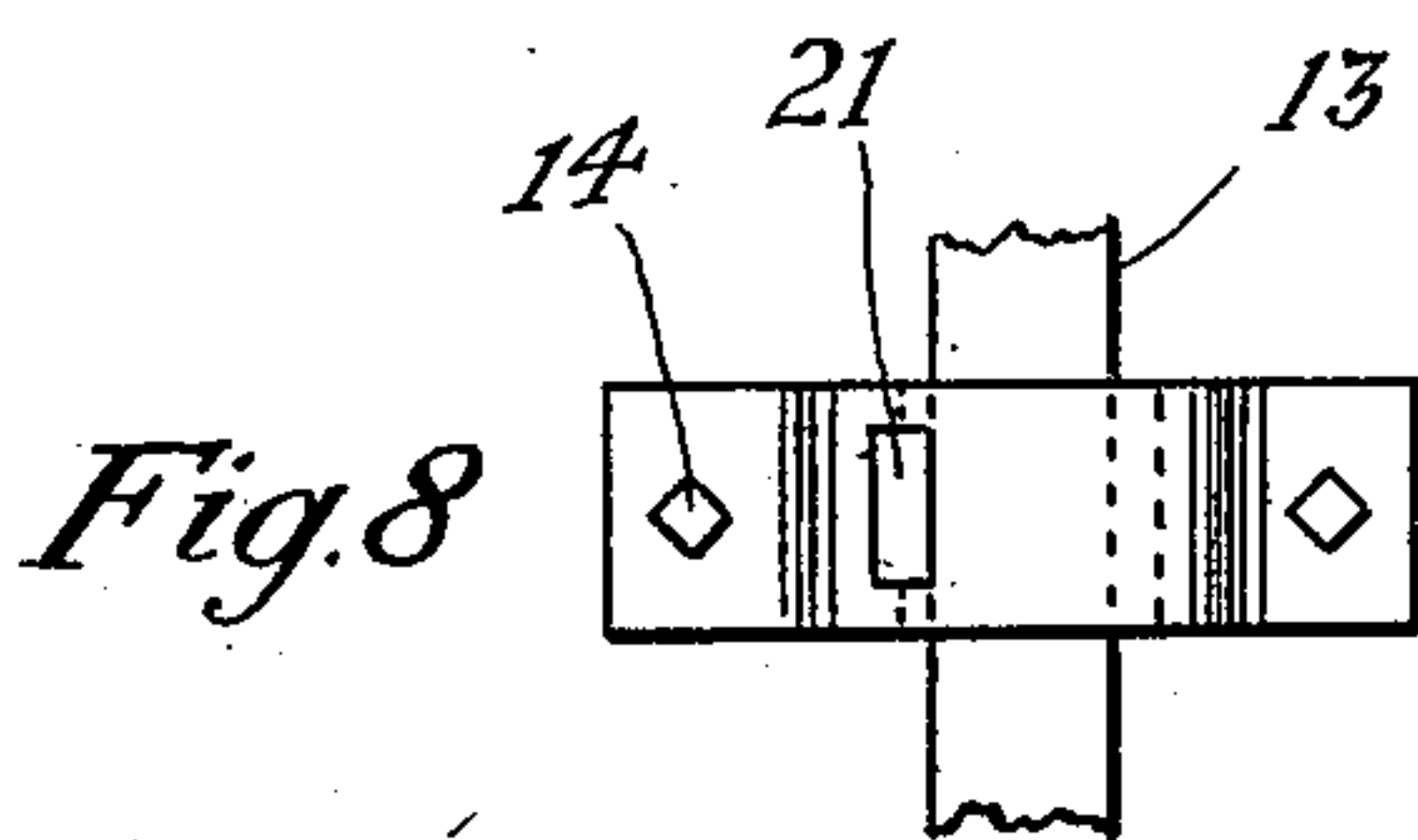
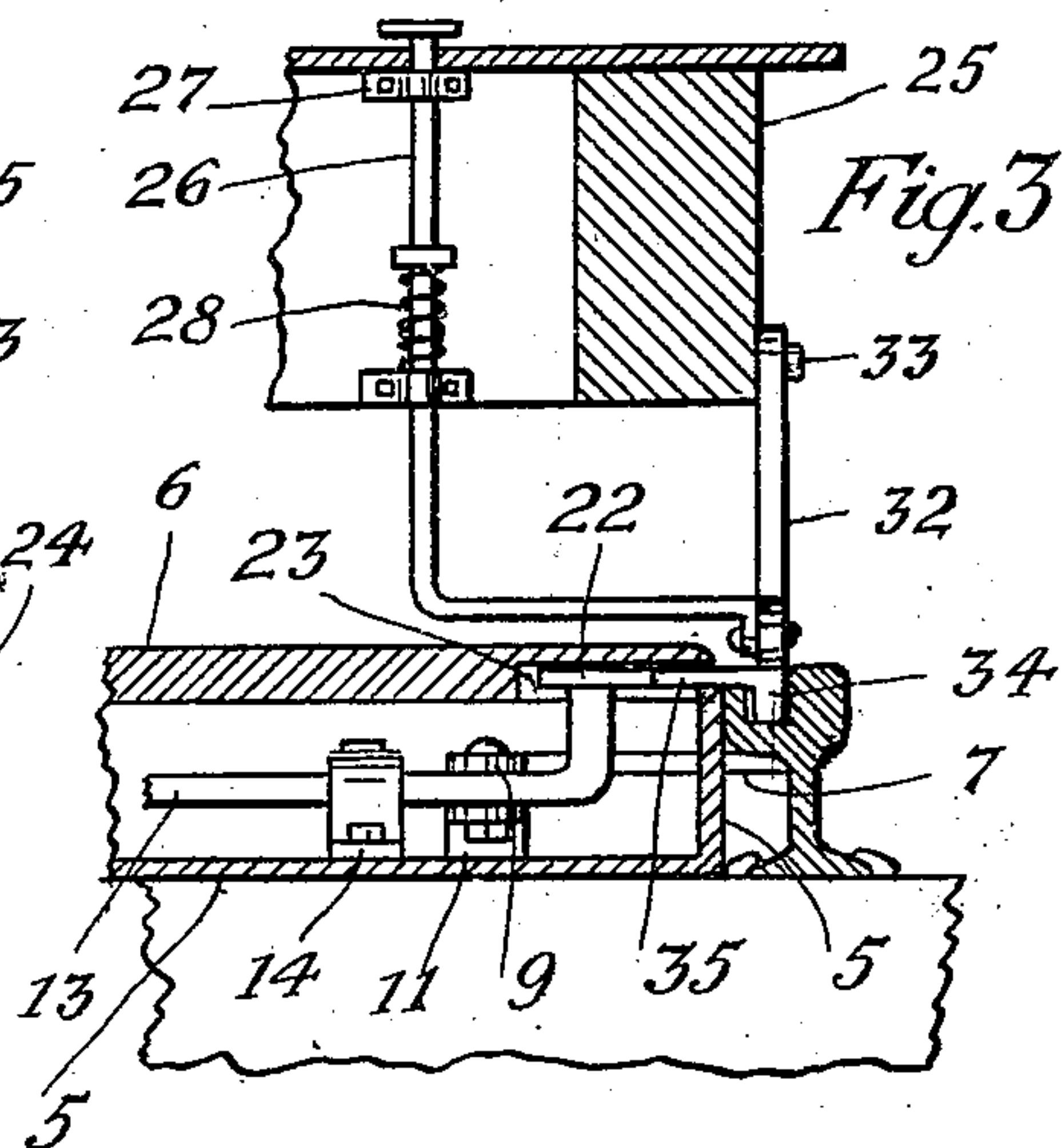
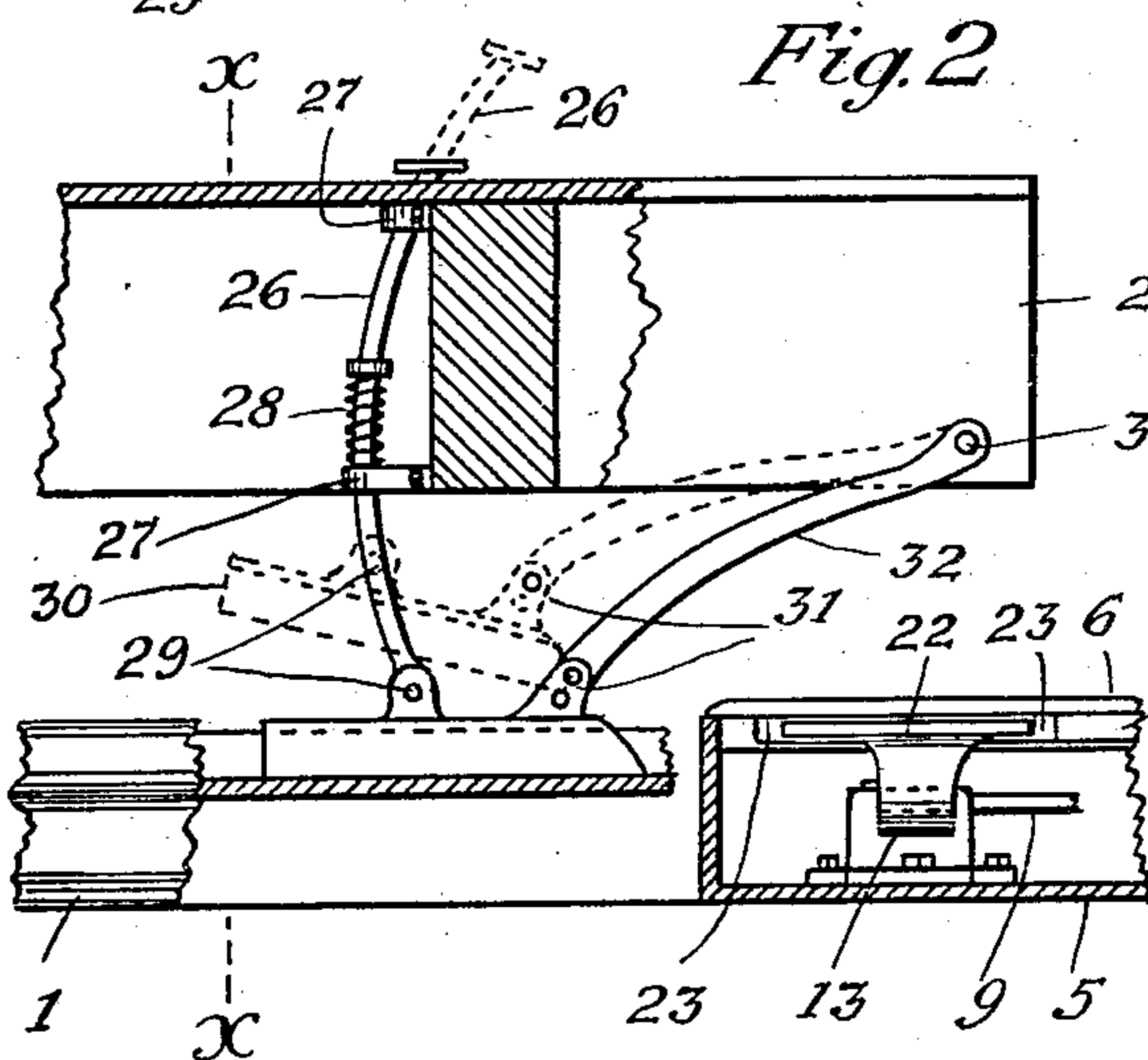
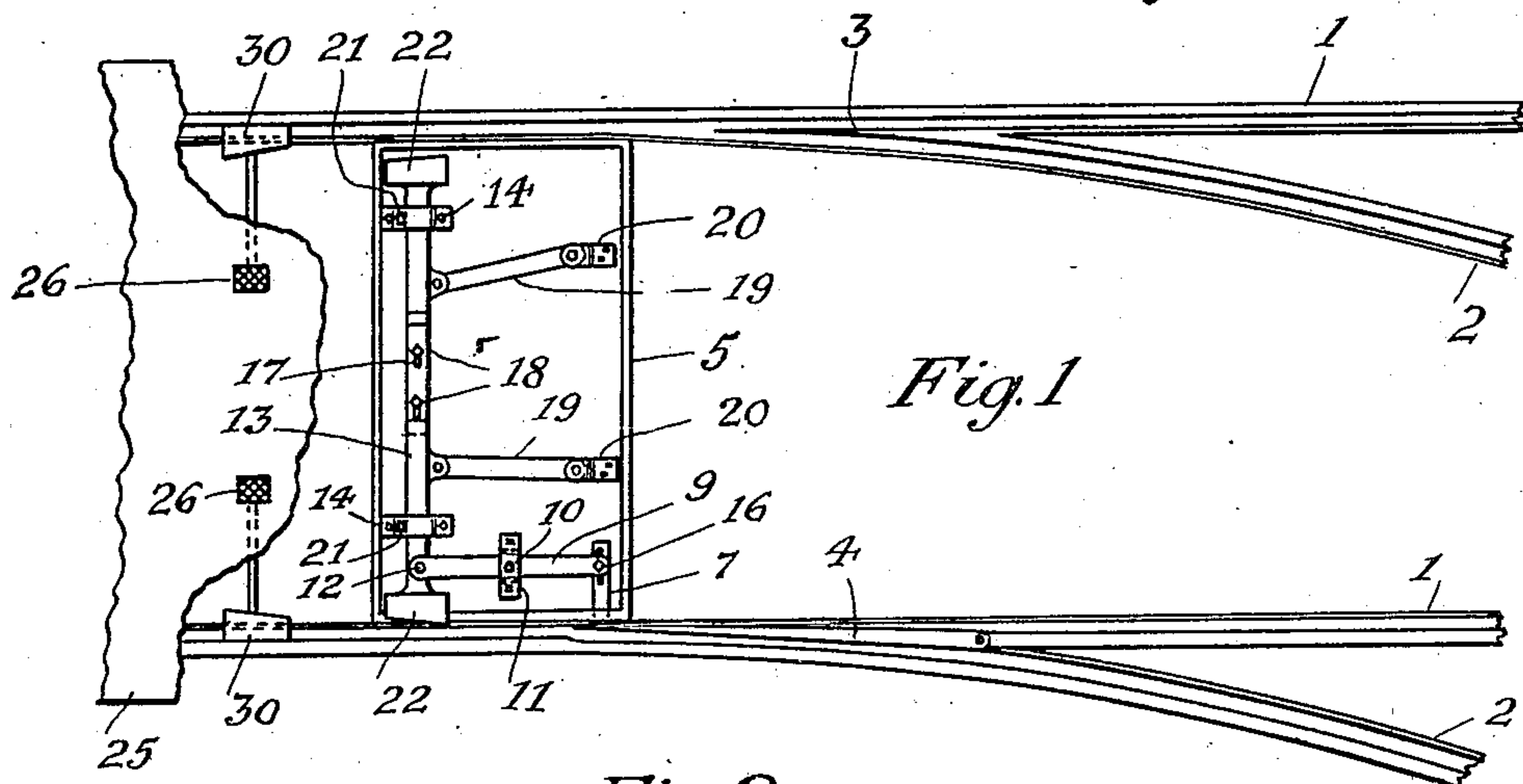


C. E. BADGER.  
SWITCH OPERATING MECHANISM.

APPLICATION FILED JAN. 17, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



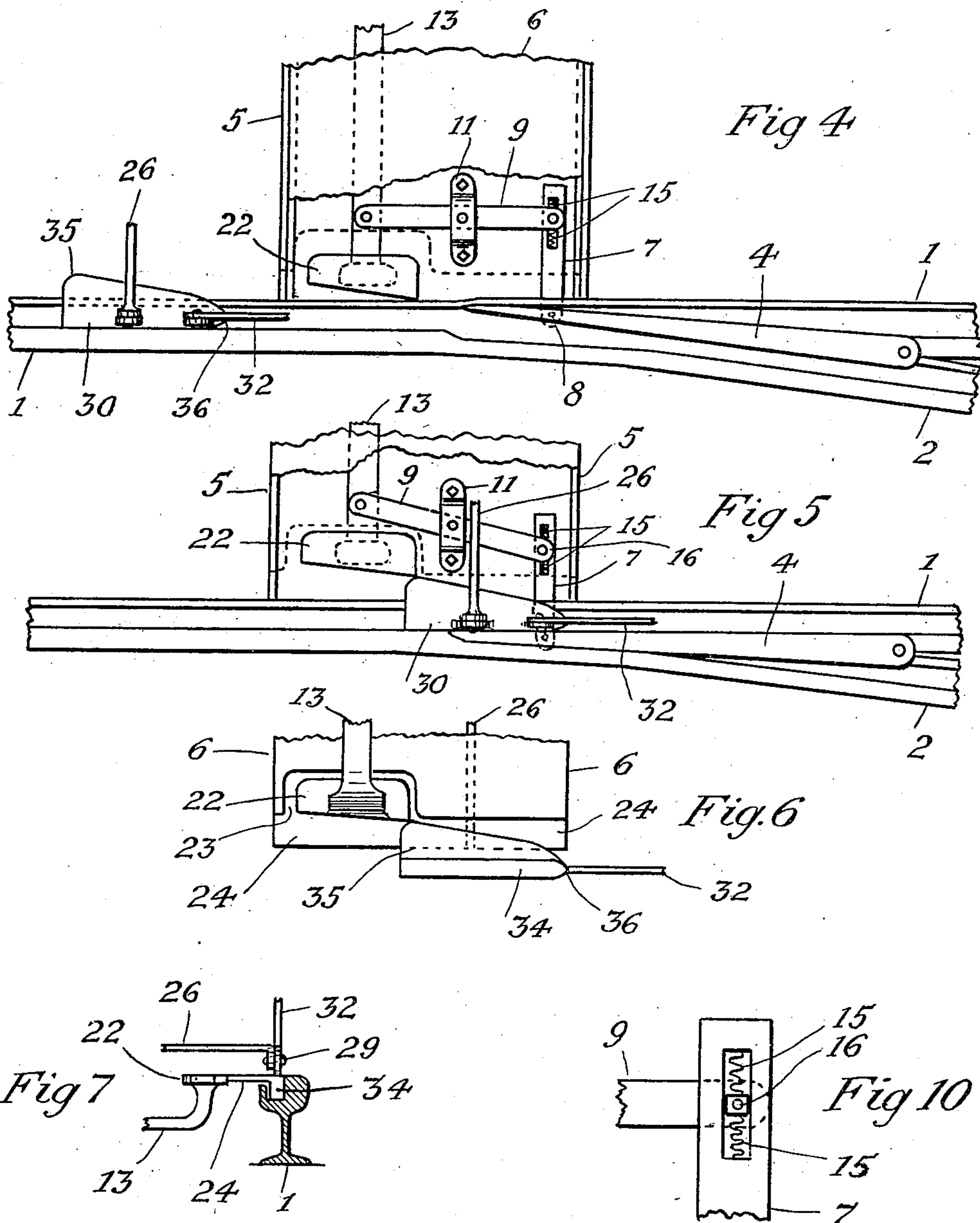
Witnesses  
Thos. Lagaard  
H. A. Bourman.

Inventor  
Charles E. Badger  
By *P. H. Funkel*  
his Attorney.

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2 SHEETS—SHEET 2.



Witnesses  
*Thos. Legaard.*  
*H. A. Bowman.*

Inventor  
*Charles E. Badger*  
 By *P. H. Funkel*  
 his Attorney



# UNITED STATES PATENT OFFICE.

CHARLES E. BADGER, OF MINNEAPOLIS, MINNESOTA.

## SWITCH-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 725,650, dated April 21, 1903.

Application filed January 17, 1903. Serial No. 139,374. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES E. BADGER, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Switch - Operating Mechanism, of which the following is a specification.

My invention relates to devices for operating railway-switches, and more particularly the switches of street-railroads.

The object of my invention is to enable a switch to be operated to open or close it from a car moving on the track. This end I accomplish by providing suitable devices connected with the tongue or movable point for moving it to or out of contact with the main-track rail and for holding it in positions of adjustment and providing on the car suitable devices under control of an operator for engaging the point to throw it by the movement of the car to the positions desired.

My improvements are illustrated in the accompanying drawings, in which—

Figure 1 shows a plan view of a portion of a railroad track and switch and a portion of a car equipped with the devices of my improvement. Fig. 2 is a side view of portions of the same enlarged. Fig. 3 is a transverse sectional view on the line  $x x$  of Fig. 2, showing the positions of the devices after the car has moved far enough to throw the switch-point. Fig. 4 is a top view of a portion of the devices of Fig. 1 enlarged, showing them by broken lines and the box-cover by full lines and showing the switch set for connecting the siding. Fig. 5 is a similar view of the same parts, the box-cover having been removed and showing the point thrown out to cause the car to continue on the main line. Fig. 6 is a view from the under side of Fig. 5 with the box-cover in place. Fig. 7 shows portions of Fig. 5 viewed from the left. Figs. 8 and 9 are detail views of the devices for supporting the throwing-bar, and Fig 10 is a detail view of the spring devices used in the throwing mechanism.

In the drawings 1 and 2 respectively designate the main and siding rails of the ordinary grooved form used for street-railroads.

3 is the stationary point or tongue, and 4

the movable point, the throw of which is indicated by its positions shown in Figs. 4 and 5.

The devices for moving the point 4 from the one position to the other may be housed in a box 5 set between the rails and provided with a cover 6, the exposed surface of which is shown as being roughened and nearly on a level with the top of the rails. The point 4 is connected near its free end to an arm 7, that is pivoted to a lever within the box and extends outward through openings in the end of the box and in the rail to the point to which it is attached by a pivot 8. The lever 9, to the end of which the arm is pivoted, extends nearly parallel with the track and is fulcrumed at 10 to a standard 11, rising from the bottom of the box. The other end of this lever is pivoted at 12 to a transverse bar 13, and the bar is supported in fixed guides 14, in which it is loose enough to permit it to slide lengthwise and also have slight horizontal transverse play. The reciprocations of this bar will obviously turn the lever 9 on its fulcrum, and thereby move the arm 7 outward or inward and correspondingly throw the switch-point.

To provide for the contingency of obstructions lodging in the path of movement of the switch-point, which might cause the breaking of some portion of the devices in operation, springs 15 may be provided at opposite sides of the pivot 16, which is free to slide in the arm 7. The springs should be sufficiently stiff to permit the arm to perform its proper function in throwing the switch-point and to yield only under the extraordinary pressure arising from an unyielding obstruction to the movement of the point.

For the purpose of regulating the length of the bar 13, and thereby adjusting the positions of the friction devices on its ends relative to the tracks, the bar may be spliced at the middle, as indicated at 17, and the parts secured together by bolts 18.

The bar 13 is given a slight oscillatory horizontal movement when reciprocated by means of connecting-bars 19, that are pivoted to its end portions and to fixed standards 20 on the box-bottom. In the guide-pieces 14 are secured blocks of rubber 21 or suitable metal springs in position to exert pressure against



the bar 13 when it is moved to contact with them by the swinging movement of the bars 19. The latter are preferably set at a slight inclination to each other, so that they will alternately press the opposite ends of the bar 13 against the blocks 21. The frictional contact of the reciprocating bar with these springs will serve to hold it in place, and thus prevent the accidental displacement of the switch-point, while the frictional resistance will not be sufficient to prevent proper operation of the mechanism when desired.

On the ends of the bar 13 are fastened friction-blocks 22, the end portions of the bar being upwardly bent to support the blocks in suitable recesses 23 in the under surface of the cover 6 of the box. The box-cover edges may lie close to the rails and have recesses 24 along their lower margins extending parallel with the rails to provide a passage-way for the flanges of the shoes hereinafter described.

In the forward portion of the car 25 are arranged foot-levers 26, that extend downward through the floor, and thence laterally outward toward the rails. Their movements are guided by suitable guides 27, attached to the car, and they are provided with springs 28 for retracting them when released from foot-pressure. To the outer ends of these levers are attached by suitable pivoted connections 29 friction-shoes 30, arranged to frictionally engage the blocks 22 on the bar 13. The connections 29 are preferably made near or in rear of the middle of the shoes, and to the forward portions of the shoes are attached by suitable pivotal connections 31 the ends of rods or bars 32, that have their upper ends pivoted, as at 33, to the car-frame. By this arrangement the shoes when lowered are made to move in arcs, and thereby present their noses in inclined position to the rails, as indicated in Fig. 2, before their soles are lowered to contact with the rail-surfaces. The shoes consist of a body portion 34, the sole of which slides in the groove of the rail, and an inwardly-extending flange 35, that is comparatively wide at the rear and tapers to a point or nose 36. This flange is substantially horizontal when the sole is on the rail and its under surface is slightly above the top of the inner flange of the rail and in the plane of the recess 24 in the cover 6, and hence in position to engage the outer inclined face of the block 22 as the car advances. The frictional contact of the tapering shoe-flange with the correspondingly tapering edge of the block as the former is moved past the latter by the advance of the car serves to slide the engaged block inward, and thereby thrust the bar 13 to move the switch-point 4 in opposite direction by the operation of the lever 9 and arm 7.

In use if the point is in position to connect the siding with the main track, as shown in Figs. 1 and 4, and it is desired to run the car on the main track the operator as he ap-

proaches the switch and without stopping the movement of the car presses down the foot-lever at the side of the car nearest the switch. This will serve to lower the shoe to the track, as indicated in Fig. 2, and as it is advanced it will contact with the adjacent block 22 and move it inward to throw the switch-point, and thereby close the branch and reopen the main line, as indicated in Fig. 5. Such movement of the mechanism will obviously bring the other block 22 to close proximity to the opposite rail, and if then it is desired to run a car from the main line onto the siding the operator as he approaches the switch presses down the foot-lever at the side of the car opposite the siding and the shoe will engage the block at that side and operate the mechanism to return the point to the position shown in Figs. 1 and 4.

As the mode of operation would not be changed by a variation of the mechanical construction of the devices, I do not wish to limit myself to the specific devices shown and described.

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

1. In a switch-operating mechanism, in combination, a switch-point, a throwing-bar connected therewith for operating it, a pair of connecting-bars pivoted to the throwing-bar and to fixed supports for causing the throwing-bar to oscillate when reciprocated, springs against which opposite portions of the bar alternately bear to restrain its reciprocatory movement, and devices provided on the bar and on a car for causing the movement of the car to reciprocate the bar, substantially as set forth.

2. In a switch-operating mechanism, in combination, a switch-point, a throwing-bar connected therewith for operating it, means connected to the throwing-bar for causing it to oscillate when reciprocated, springs against which opposite portions of the bar alternately bear to restrain its reciprocatory movement, a lever connected with the bar, an arm pivotally connected to the switch-point, a spring-pressed pivot connecting the arm to the lever and adapted to yield under unusual pressure, and friction devices provided on the ends of the bar and on the car for causing the bar to reciprocate to throw the switch-point, substantially as set forth.

3. In a switch-operating mechanism, in combination, a switch-point, a throwing-bar connected therewith for operating it, means connected to the throwing-bar for causing it to oscillate when reciprocated, springs against which opposite portions of the bar alternately bear to restrain its reciprocatory movement, friction-shoes carried at opposite sides of a car, and devices for separately lowering the shoes to position to engage the appropriate block for throwing the switch-point in the direction desired, substantially as set forth.

4. In a switch-operating mechanism, in combination, a switch-point, a throwing-bar



connected therewith for operating it, means  
connected to the throwing-bar for causing it  
to oscillate when reciprocated, springs against  
which opposite portions of the bar alternately  
5 bear to restrain its reciprocatory movement,  
and devices provided on the bar and on a car  
for causing the movement of the car to recip-  
rocate the bar, substantially as set forth.

10 5. In a switch-operating mechanism, the  
combination with the switch-point, of a throw-  
ing-bar for operating it, lever devices con-  
necting the bar with the point, friction-blocks  
on the ends of the bar, friction-shoes pro-

vided on a car for engaging said blocks, and  
a covered housing for the switch-throwing 15  
mechanism having suitable recesses in the  
cover edges to permit free movement of said  
blocks and shoes, substantially as set forth.

In testimony whereof I have signed my  
name to this specification, in the presence of 20  
two subscribing witnesses, this 2d day of  
January, 1903.

CHARLES E. BADGER.

Witnesses:

H. A. BOWMAN,  
P. H. GUNCKEL.