

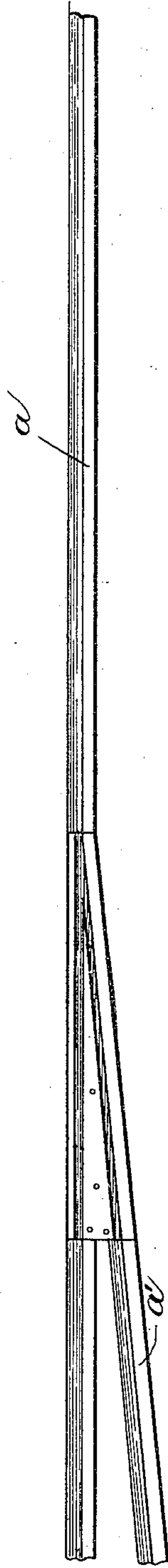
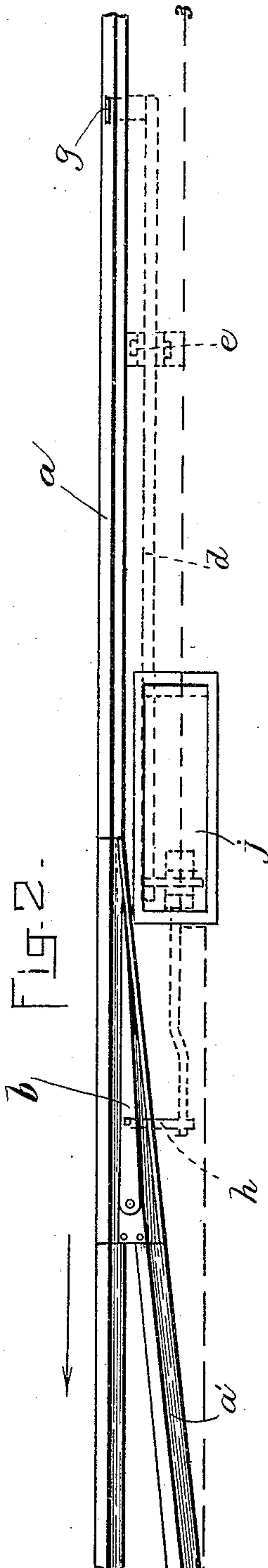
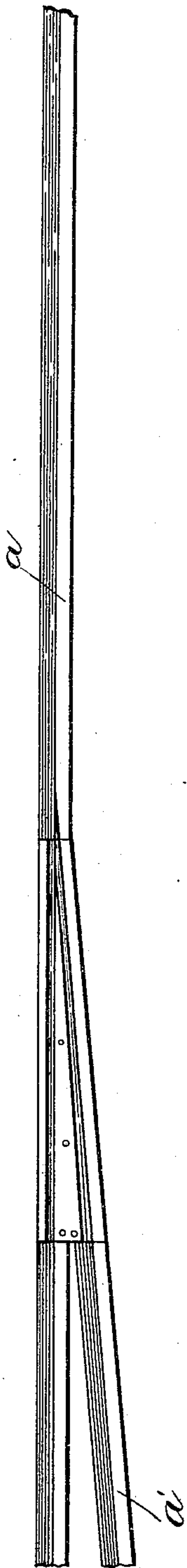
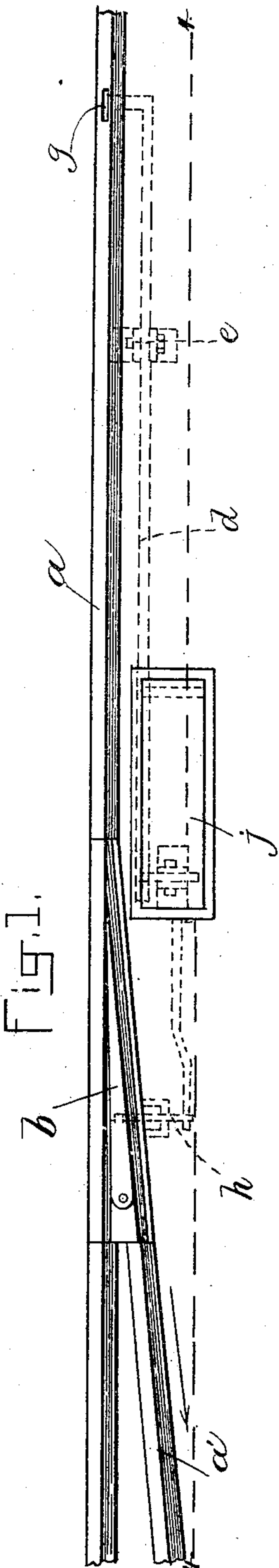
(No Model.)

3 Sheets—Sheet 1.

J. N. & C. F. DUVAL.  
SWITCH OPERATING MECHANISM.

No. 444,426.

Patented Jan. 13, 1891.



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(No Model.)

3 Sheets—Sheet 2.

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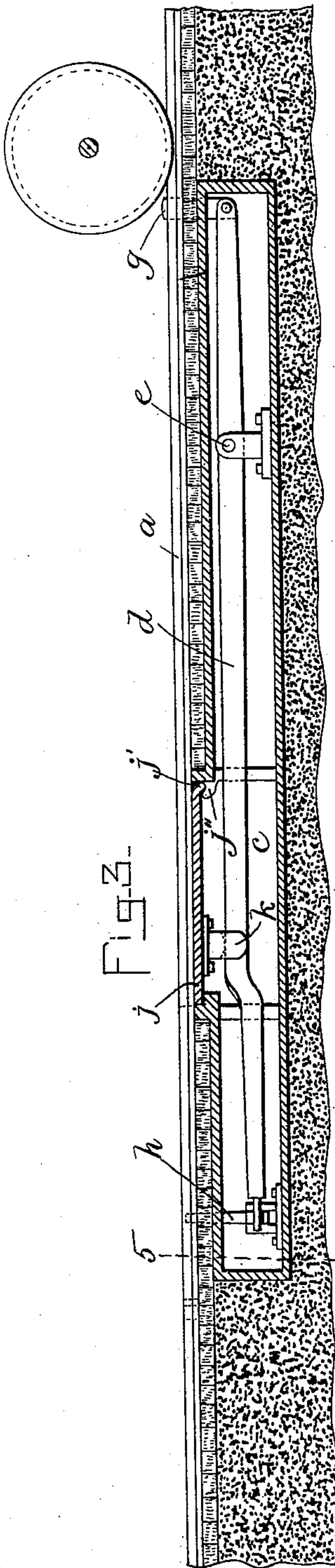


Fig. 3-

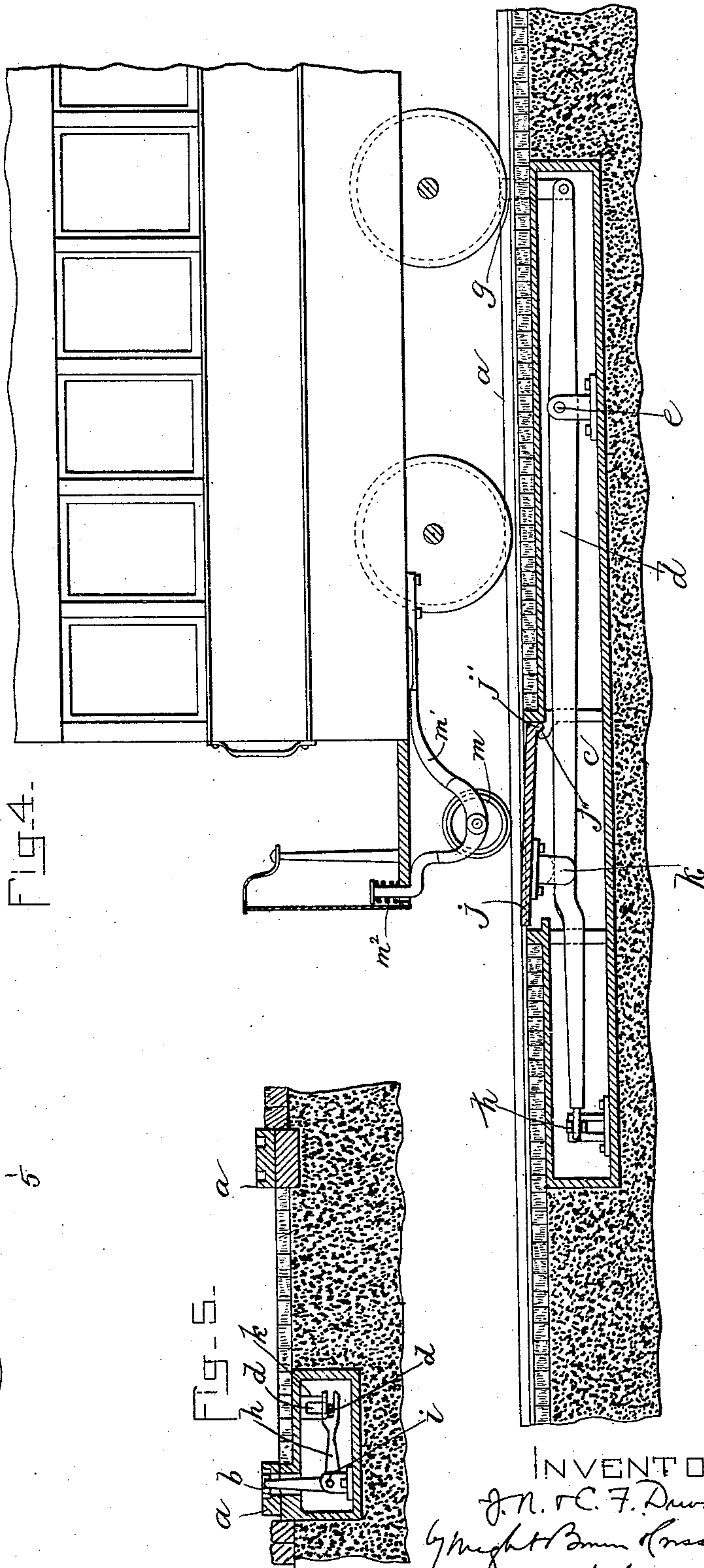


Fig. 4-

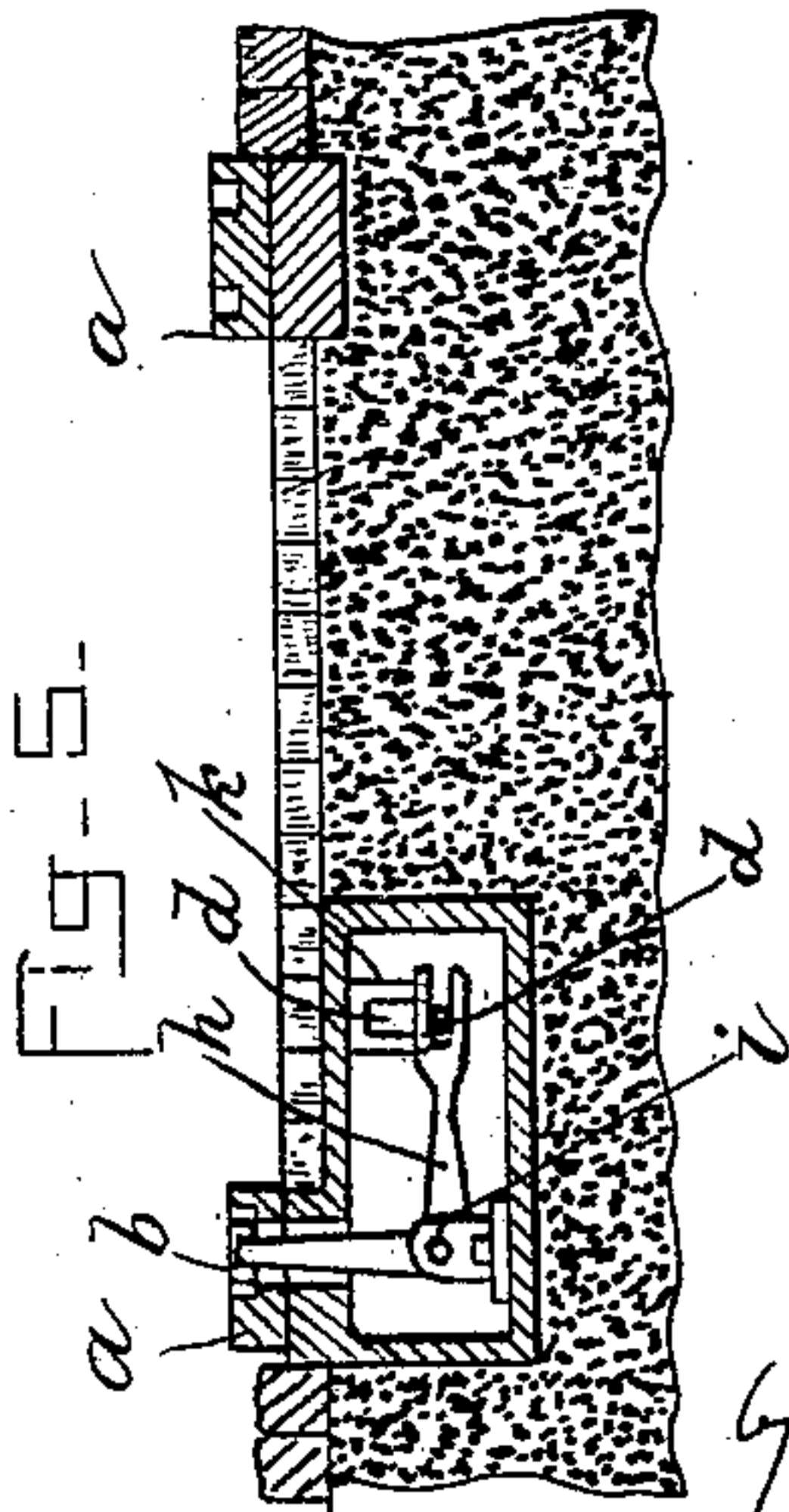


Fig. 5-

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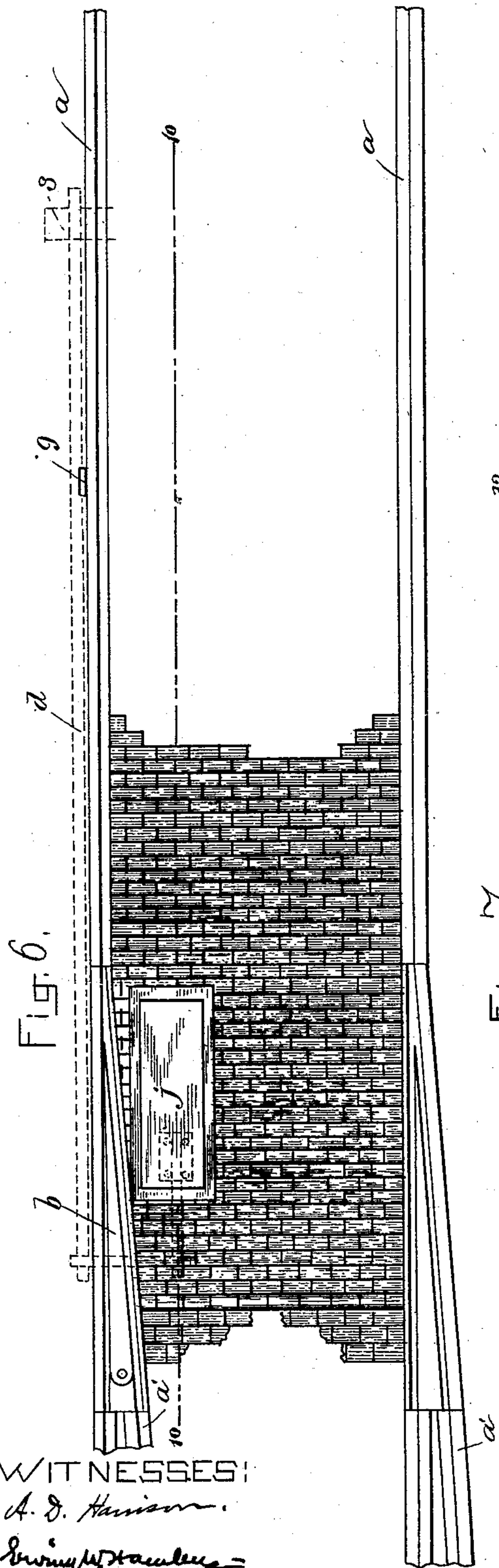
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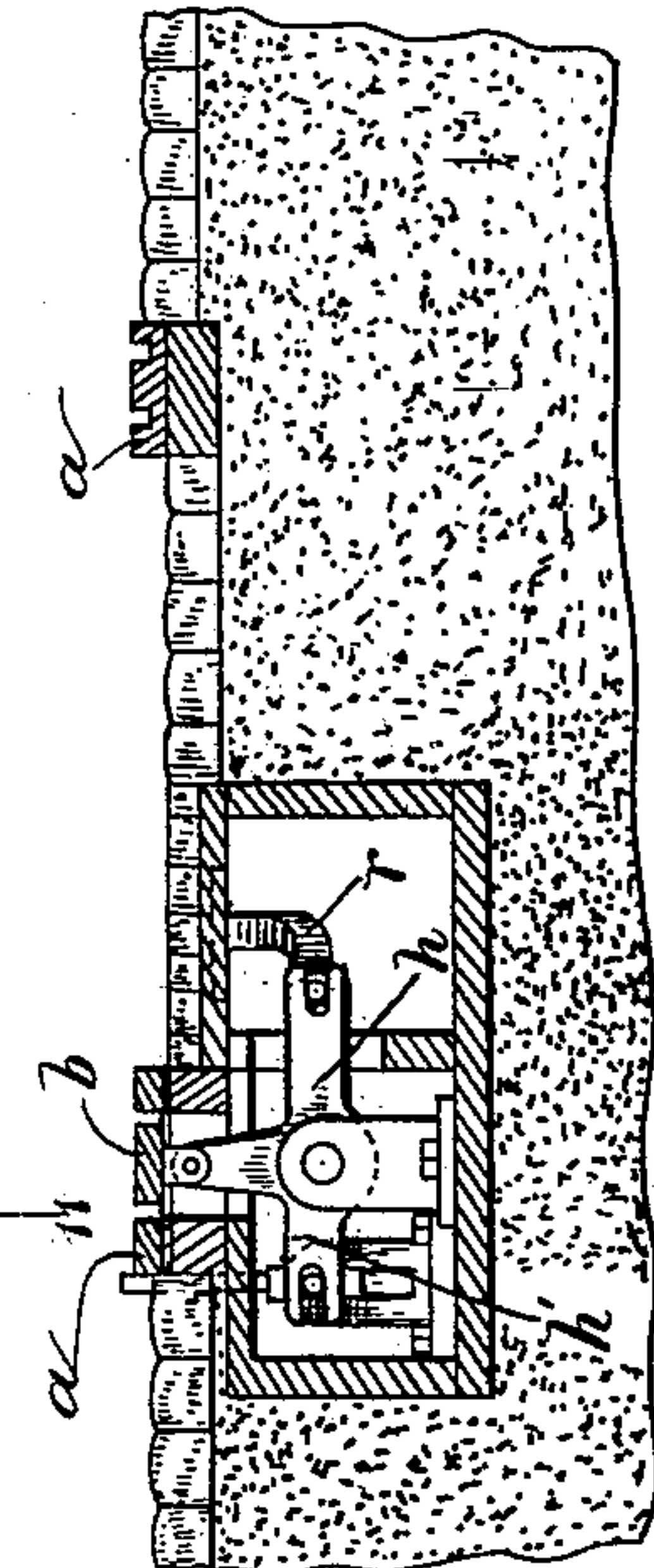
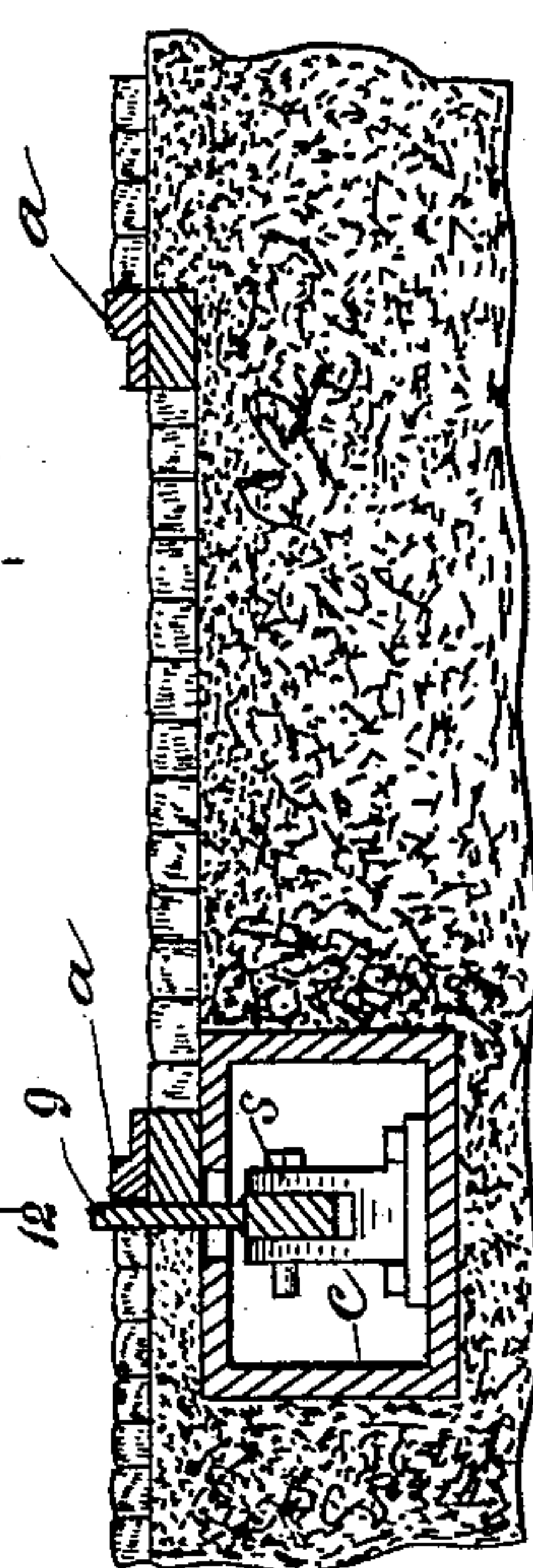
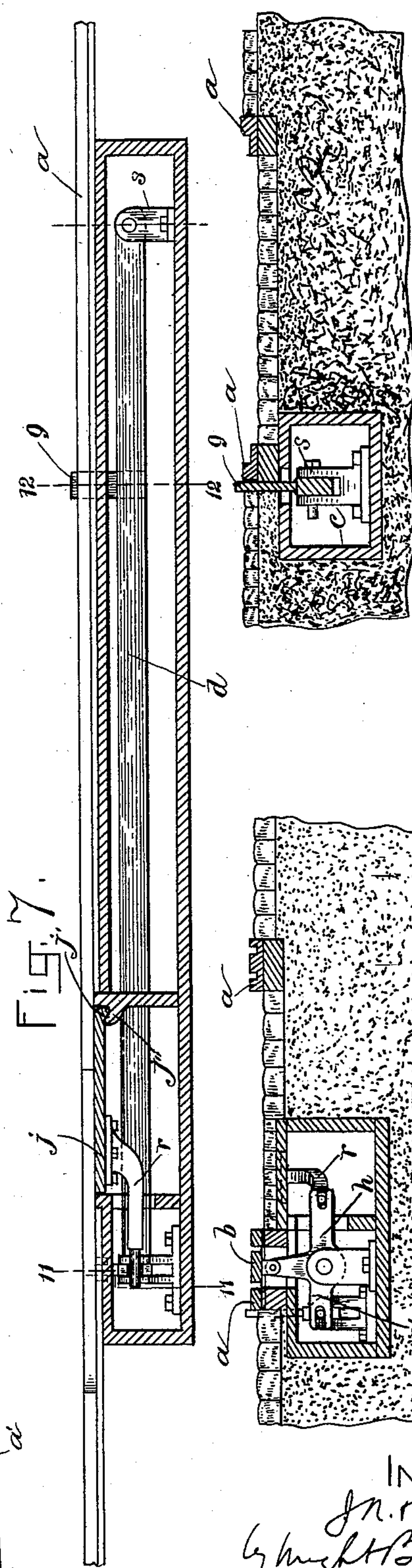
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# UNITED STATES PATENT OFFICE.

JOSEPH N. DUVAL AND CHARLES F. DUVAL, OF BOSTON, MASSACHUSETTS,  
ASSIGNORS TO THE DUVAL AUTOMATIC SWITCH COMPANY, OF SAME  
PLACE.

## SWITCH-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 444,426, dated January 13, 1891.

Application filed February 13, 1890. Serial No. 340,241. (No model.)

*To all whom it may concern:*

Be it known that we, JOSEPH N. DUVAL and CHARLES F. DUVAL, of Boston, in the county of Suffolk and State of Massachusetts, have  
5 invented certain new and useful Improvements in Switch-Operating Mechanism, of which the following is a specification.

This invention has for its object to provide improved switch-operating mechanism,  
10 adapted to be operated to effect one movement of the switch by the wheel of an approaching car, and to effect the opposite movement of said switch by the depression of an attachment on the car by the act of an at-  
15 tendant thereon.

The invention consists in the improved combination of devices, which I will now proceed to describe and claim.

In the accompanying drawings, forming a  
20 part of this specification, Figure 1 represents a plan view of a portion of a street-railroad track provided with my improvement, the switch being turned to connect the main track with a branch or side track. Fig. 2 repre-  
25 sents a similar view showing the switch turned to make the main track continuous. Fig. 3 represents a section on line 3 3, Fig. 2. Fig. 4 represents a section on line 4 4, Fig. 1. Fig. 5 represents a section on line 5 5, Fig. 3. Fig.  
30 6 represents a top view of a modification. Fig. 7 represents a section on line 10 10, Fig. 6. Fig. 8 represents a section on line 11 11, Fig. 7. Fig. 9 represents a section on line 12 12, Fig. 7.

35 The same letters of reference indicate the same parts in all the figures.

Referring for the present to Figs. 1 to 5, inclusive, *a a* represent the rails of the main track, and *a' a'* represent the rails of a branch  
40 track or siding.

*b* represents a pivoted switch, which is arranged in the usual manner in its relation to the rails *a* and *a'*, and is adapted to either connect the rail *a* with the rail *a'* to switch  
45 the car from the main track to the branch, as shown in Fig. 1, or to make the main track continuous, as shown in Fig. 2.

Under the road-bed is an elongated box or casing *c* extending lengthwise of the track  
50 and containing the lever *d*, which is pivoted at *e* to a fixed bracket or ear in said casing,

and is divided into a longer and a shorter arm. To the shorter arm of said lever is connected an upright arm of plunger *g*, which projects upwardly through a slot in one of  
55 the track-rails *a*, so that the wheels of an approaching car will pass over said plunger and depress the same when the lever is in a given position, with the plunger projecting above the tread-surface of the rail. The longer arm  
60 of the lever *d* is loosely connected or jointed to one arm of a bell-crank lever *h*, which is pivoted at *i* to a fixed ear or bracket in the casing *c*. Said lever extends at right angles with the lever *d*, and one of its arms extends  
65 upwardly, and is engaged with the switch-point *b* at a short distance from the pivoted end thereof, the arrangement being such that when the shorter arm of the lever *d* is depressed by the contact of a car-wheel with the  
70 plunger *g* the switch will be thrown to the position shown in Fig. 1, thus connecting the branch with the main track. When the switch-point *b* is in the position shown in Fig. 2, the shorter arm of the lever *d* is necessarily  
75 raised, so that a car approaching the switch will, by the contact of one of its forward wheels with the plunger *g*, move said lever in the direction required to throw the switch to the position shown in Fig. 1, to make the  
80 branch continuous with the main track.

*j* represents a platform or table having at one end a lug *j'* bearing on a fixed supporting-lug *j''*, formed on or attached to the casing  
85 *c*, the plate *j* being adapted to rise and fall at its other end, the lug *j''* serving as a pivotal support for said plate. The free end of the plate *j* is provided on its under side with a bracket *k*, which is engaged with the longer  
90 arm of the lever *d*. It will be seen, therefore, that when the plunger *g* and the shorter arm of the lever *d* are depressed by the contact of a car-wheel with said plunger the longer arm of the lever *d* and the swinging end of  
95 the platform *j* will be raised, as shown in Fig. 4, the parts being in the position shown in said figure when the switch is in position to make the branch continuous with the main track, as shown in Fig. 1.

If the approaching car is to go upon the  
100 main track, the driver depresses a wheel or other suitable attachment *m* on the car, (here-



inafter more fully described,) said attachment being arranged to bear upon the platform *j* and depress the raised end thereof while the car is passing over said platform, the platform  
 5 being at a sufficient distance from the plunger *g* to permit all the wheels of the car to pass onto the section of the track intervening between the plunger and the platform *j* before said platform is depressed by the attachment *m*, so that the movement given to  
 10 the lever *d* by the depression of said platform will not be interfered with by the rear wheel of the car. It will be seen, therefore, that the depression of the platform *j* from the position shown in Fig. 4 will depress the longer  
 15 arm of the lever *d*, and through the bell-crank lever *h* will throw the switch *b* to the position shown in Fig. 2, thus making the main track continuous.

20 The attachment on the car which operates the table *j* is preferably a wheel or roller journaled in bearings in a spring-arm *m'*, which is attached at one end to the body of the car, its free end projecting upwardly  
 25 through the platform, and formed as a pedal arranged to be depressed by the foot of the driver. A downward pressure on said pedal will depress the roller *m* and cause it to come in contact with and depress the raised end of  
 30 the platform *j*, and thus give the described movement to the switch. A spiral spring *m''* may be employed to raise the arm *m'* and the roller *m* when the operator's foot is removed from the pedal.

35 It is obvious that the lever *d*, having the plunger *g* at one side of its fulcrum and the platform *j* arranged at the other side thereof, may be adapted to give the switch *b* a movement in the direction opposite to that  
 40 above described when the plunger *g* is depressed by a car-wheel, so that the depression of said plunger will throw the switch to the position shown in Fig. 2 and make the main line continuous instead of throwing the  
 45 switch to connect the branch with the main line, as shown in Fig. 1. The effect produced by the contact of a car-wheel with the plunger is to be determined by the existing circumstances. If more cars are to go upon the  
 50 rails *a' a'* than upon the rails *a a*, the arrangement shown and described, whereby the switch will be turned to the position shown in Fig. 1 by the depression of the plunger *g* will be found the most convenient; but if the use of  
 55 the main-track rails is to be the more frequent the connecting mechanism should be arranged so that the depression of the plunger will throw the switch to the position shown in Fig. 2.

60 In Figs. 6, 7, 8 and 9 I have shown a modification in which the lever *d*, to which the plunger *g* is attached, is located outside of the track, and is pivoted at one end to a fixed car or bracket *s* in the casing *c*. The bell-

crank lever *h* is in this case provided with 65 an additional arm *h'*, which is engaged with the swinging end of the lever *d*. The platform *j* in this case is not connected with the lever *d*, but has an arm *r*, which is engaged with the bell-crank lever *h*. The operation 70 of this modification is the same as that of the construction originally described, the chief difference being that the platform, instead of being connected with the switch through the medium of the lever *d*, is connected by its 75 arm *r* with the bell-crank lever, and through the latter with the switch.

I claim as my invention—

1. In a street-railway switch, the combination of the main and branch rails, a pivoted 80 switch-point, a bell-crank lever pivoted to a fixed support under the road-bed and connected with the switch-point, a lever *d*, pivoted to a fixed support under the road-bed and engaged at one end with the bell-crank 85 lever, an upwardly-projecting plunger connected with said lever and arranged with its upper end in position to be depressed by a car-wheel approaching the switch on one of the main-track rails, and thereby move the 90 switch in one direction, a hinged or vertically-swinging platform located on the road-bed between the main-track rails, so that it may be depressed by an attachment on the platform of a car, the swinging end of said platform being connected, as described, with the 95 switch-point, whereby the depression of the platform is caused to move the switch in the opposite direction, and a car having a vertically-movable attachment or operating device, 100 as *m*, adapted to be depressed by the driver and arranged to act on said platform when depressed, as set forth.

2. In a street-railway switch, the combination of the main and branch rails, a pivoted 105 switch-point, a bell-crank lever pivoted to a fixed support under the road-bed and having one arm engaged with the switch-point, a lever *d*, pivoted to a fixed support in the casing under the road-bed, and having a longer arm 110 engaged with the bell-crank lever and a shorter arm provided with a plunger, which projects upwardly through the tread-surface of one of the main-track rails, and a hinged platform bearing at its swinging end upon 115 the longer arm of said lever and adapted to be operated by an attachment on a car, as set forth.

In testimony whereof we have signed our names to this specification, in the presence 120 of two subscribing witnesses, this 5th day of February, A. D. 1890.

JOSEPH N. DUVAL.  
 CHARLES F. DUVAL.

Witnesses:

C. F. BROWN,  
 A. D. HARRISON.