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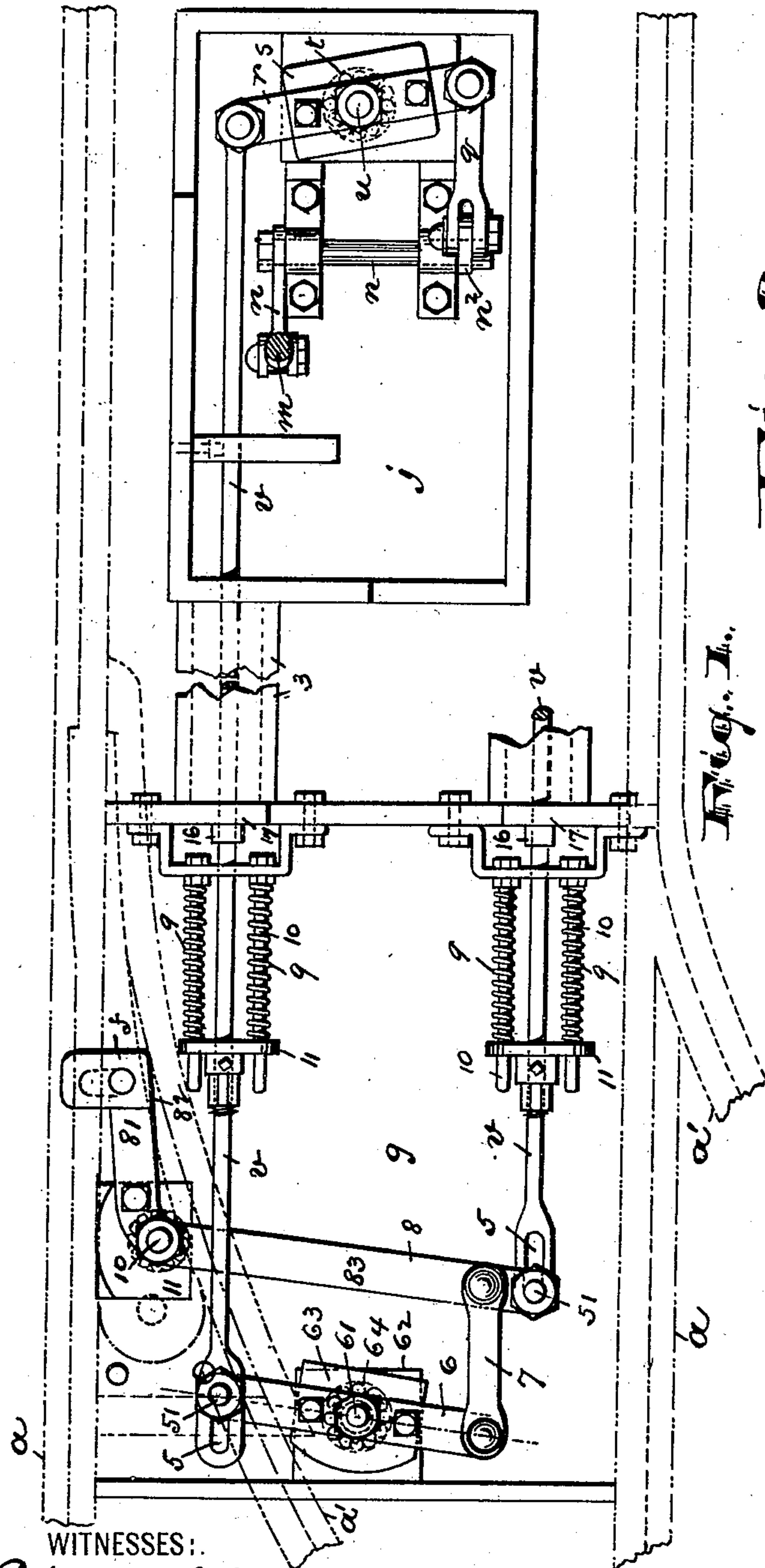
Patented Sept. 3, 1901.

F. G. SMITH.
STREET RAILWAY SWITCH.

(Application filed Feb. 1, 1901.)

(No Model.)

3 Sheets—Sheet 1.



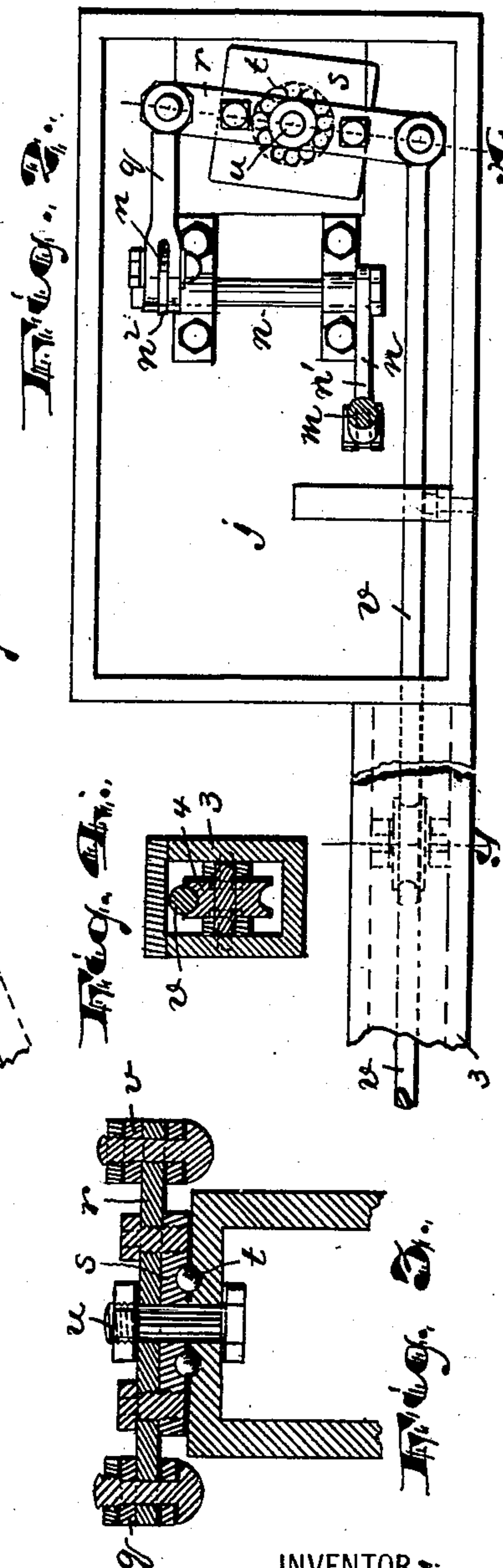
WITNESSES:..

Henry Doug
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No. 682,151.

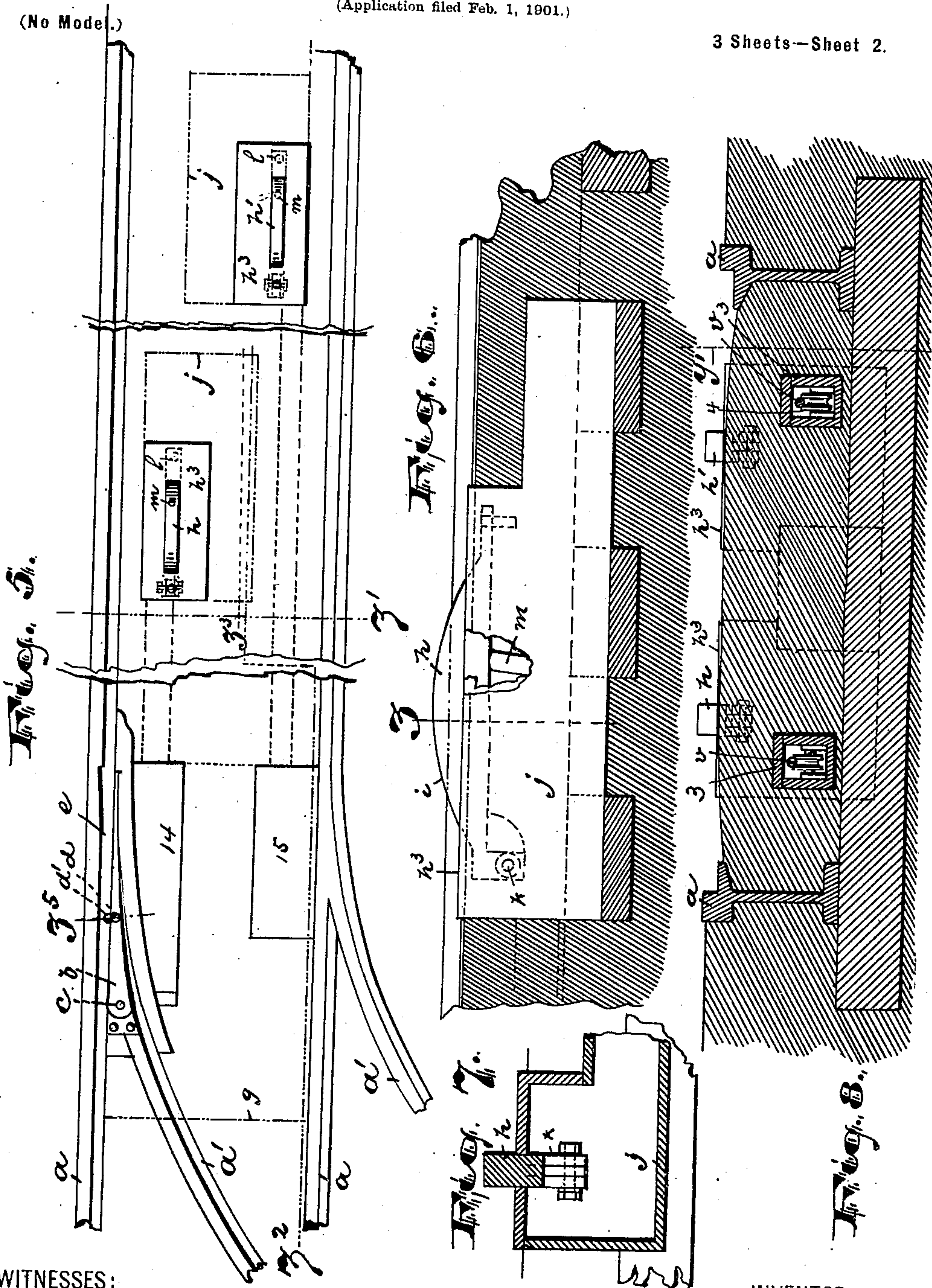
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(Application filed Feb. 1, 1901.)

(No Model.)

3 Sheets—Sheet 2.



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3 Sheets—Sheet 3.

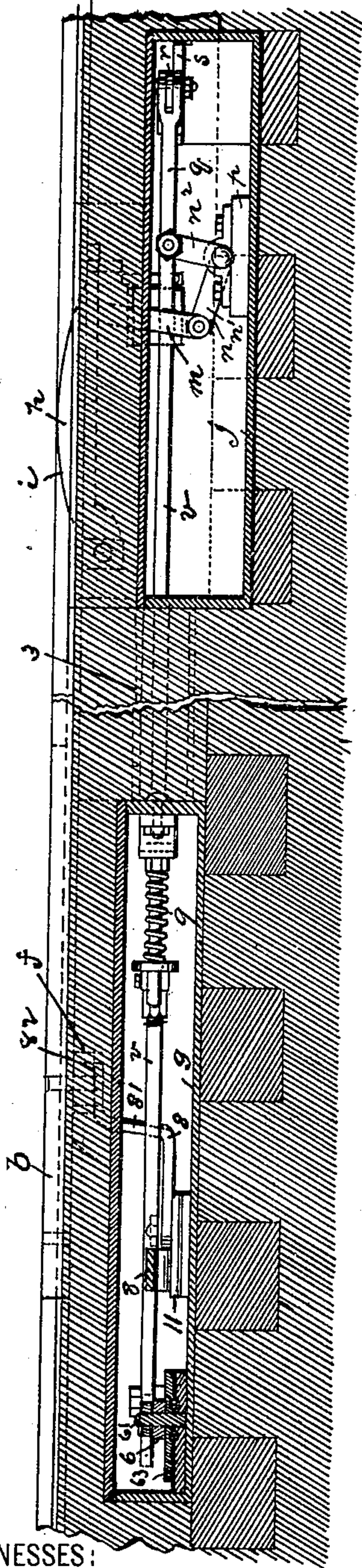


Fig. 9.

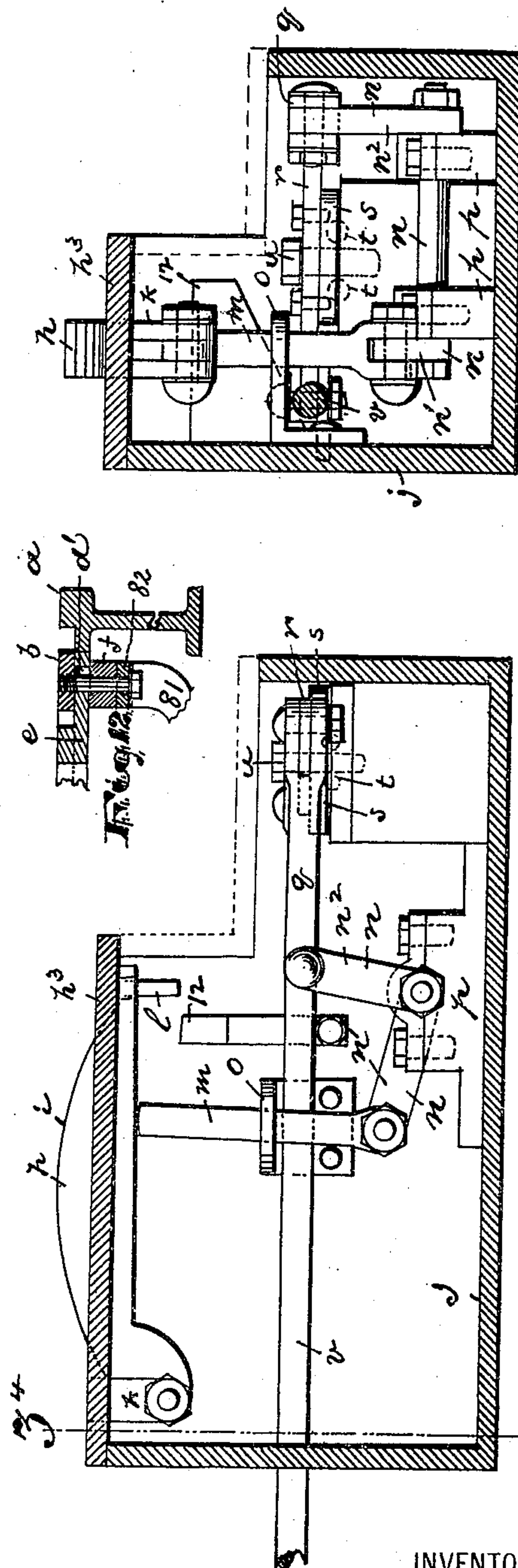


Fig. 10.

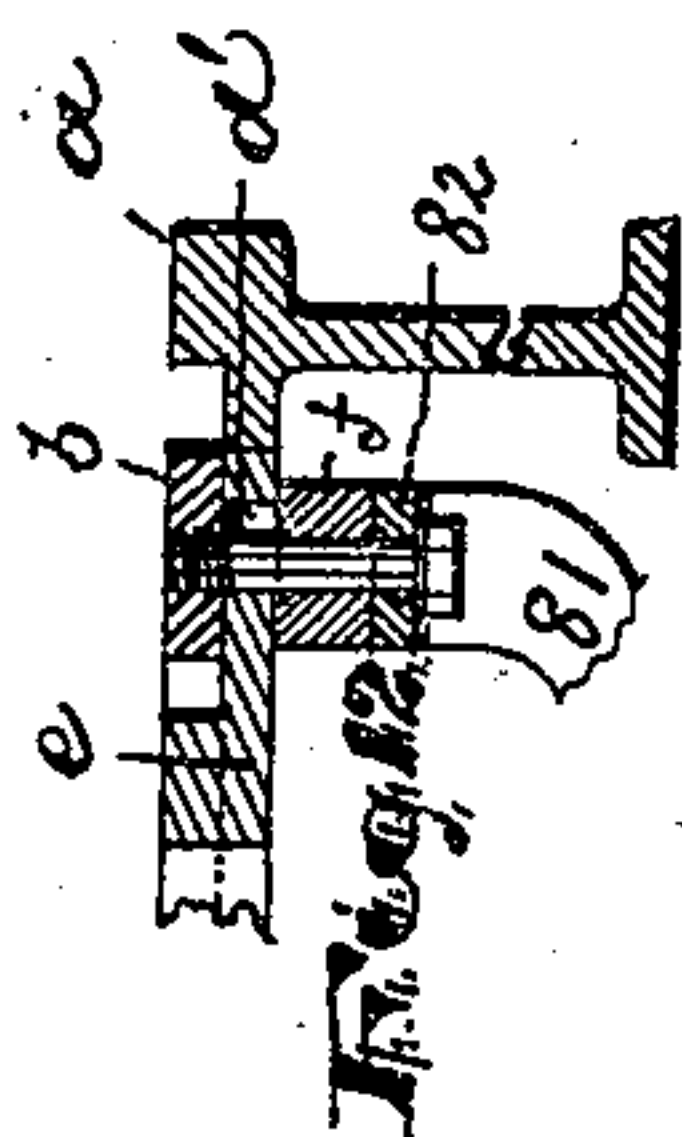


Fig. 11.

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UNITED STATES PATENT OFFICE.

FREDRICK G. SMITH, OF BLOOMFIELD, NEW JERSEY.

STREET-RAILWAY SWITCH.

SPECIFICATION forming part of Letters Patent No. 682,151, dated September 3, 1901.

Application filed February 1, 1901. Serial No. 45,605. (No model.)

To all whom it may concern:

Be it known that I, FREDRICK G. SMITH, a citizen of the United States, residing at Bloomfield, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Street-Railway Switches; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

15 This invention relates to that class of switches in which the switch is opened or closed by the action of an extension of or appliance to the car upon an extension of the switch as the car moves forward.

20 The objects of this invention are to enable the switch-tongue to be turned on its pivot by a train of mechanism, receiving its impelling movement from the car, the parts of said train of mechanism being operated with but a single exception by pulling, as distinguished from a pushing action, whereby a positive movement may be transmitted from the car to the switch-tongue with lighter operating parts, thereby reducing the cost of construction and securing effective results by a smaller exertion of motive force, there being less friction to overcome and less danger of the said parts bending or buckling while in operation, as will be understood; to enable the switch to be conveniently and easily operated by hand as well as from the car, so that the clogging of the train of power-transmitting devices will not lock or interfere with the hand-turning of said switch, and to secure other advantages and results, some of which may be referred to hereinafter in connection with the description of the working parts.

45 The invention consists in the improved street-railway switch and in the arrangements and combinations of parts of the same, all substantially as will be hereinafter set forth and finally embraced in the clauses of the claim.

50 Referring to the accompanying drawings, in which like characters of reference indicate corresponding parts in each of the several

views, Figure 1 is a plan showing the train of switch-tongue connections, the top plate or plates for protecting the same, said connections being removed. Fig. 2 is a similar plan showing one of the boxes for the operating-lever omitted from Fig. 1. Fig. 3 is a sectional detail taken through line x , Fig. 2, and Fig. 4 is a sectional detail taken through line y of Fig. 2. Fig. 5 is a general plan of the railway and switch. Fig. 6 is a section taken on line y' of Fig. 8. Fig. 7 is a section on line z of Fig. 6, and Fig. 8 is a section on line z' , Fig. 5, on an enlarged scale. Fig. 9 is a section taken on line z^2 , Fig. 5. Fig. 10 is an enlarged section on line z^3 , Fig. 5. Fig. 11 is a section on line z^4 , Fig. 10, and Fig. 12 is a section on line z^5 , Fig. 5.

In said drawings, a indicates the main-line rails, and a' the branch rails, at the junction of which is arranged a switch-tongue b , of any suitable construction, said tongue b being pivoted at c and at its smaller end free to oscillate under the power imparted by the train of devices in which my invention particularly inheres, the said train of devices being connected to said tongue b at the under side of the latter and at a point preferably about midway of the length of said tongue, as indicated at d in Fig. 5. At the connection of the branch and main line rails is arranged a switch-plate e , upon which the said switch-tongue b has its bearings, the said switch-plate being slotted, as at d' , to permit of the movement of the operating connection d , as hereinafter described, the said slot being preferably closed on the under side by a block f , Fig. 12, attached to the connections, so that dirt or water from the upper surface of the said plate cannot readily enter the box or chamber beneath. Beneath said switch-plate e and preferably extending across from one rail to another of the main-line rails is arranged a metal box g for the switch-operating mechanism. This may be a casting seated upon the ties or sleepers of the railway, or said box may be embedded between the rails in any suitable manner. Within said box g is arranged a train of devices by means of which power is transmitted to the switch-tongue. This train of mechanism is operated by shifting-levers h h' , extending up from the bed of the track at a distance

from the switch-tongue *b* and adapted to be operated from the car (not shown) either to turn the switch in one direction or the other, two of such shifting-levers being employed, one to open the switch and the other to close the same as the car progresses toward the said switch. The shifting-levers each consist, preferably, of a piece of metal rounded upon its upper face, as at *i*, as shown in Figs. 6, 9, and 10, and adapted to fit into a slotted plate *h*³, as indicated in Fig. 7, said plate being seated flush with the stonework of the street and forming a part of the road-bed. The said slotted plate is seated upon or forms the upper part of a box *j*, arranged between the tracks on the sleepers or otherwise, said box containing operating devices, as hereinafter described. The parts are arranged and disposed so that when the car travels toward the switch and the driver or motorman places his foot upon a lever or other device he brings the said lever or device into position to engage and depress the shifting-lever, by means of which movement is transmitted to the switch-tongue. The said boxes or the top plates thereof are provided on the under sides with fulcrumal bearings *k* for the shifting-levers.

At the forward free ends of the shifting-levers the same are each perforated and arranged on a guide-pin *l*, Fig. 10, depending from the under side of the top plate, whereby the said shifting-lever is held in a vertical plane. At the under side of the said shifting-levers are arranged depression-rods *m*, which are pivoted at their lower ends upon crank-levers *n*, and are each held in vertical position by a perforated guide or stay *o*, as shown in Figs. 10 and 11. The said crank-levers *n* are arranged in suitable boxes or bearings *p* upon the bottom of the box *j* and are each provided with two arms *n'* *n*², Figs. 10 and 11, one of which is pivoted to the depression-rod *m* and the other extends upward and receives a connecting-rod *q*, by means of which it is in turn connected to a second lever *r*, working in a horizontal plane, the last said lever *r* being fastened upon a plate *s*, beneath which is formed a raceway for balls *t*, so that the said horizontally-movable lever is free to move on the fulcrum *u* on said balls. At the opposite ends of the said levers *r* from the ends to which the connecting-rods *q* are attached are second connecting-rods *v*, which extend lengthwise of the track out from the boxes *j* into the box *g*, before referred to, adjacent to the switch-tongue. The last said connecting-rods may be protected by inclosing conduits 3, Fig. 3, which may contain supporting-rollers 4, as in Fig. 4. In said box *g* the last said connecting-rods are slotted at 5, Fig. 1, and are loosely connected to means for operating the switch-tongue *b*, as clearly indicated in Fig. 1. Here is shown a horizontally-movable lever 6, which is connected by means of a connecting-rod 7 to a bell-crank lever 8, fulcrumed at 10 on a pivotal plate 11, also ar-

ranged on ball-bearings. The said bell-crank lever 8 has a bent arm 81 extending up toward the under side of the switch-tongue, the upper extremity 82 of which arm is turned to lie in a horizontal plane and provides a seat for the block *f*, lying beneath a slot *d'*, above referred to. To the arm 83 of the said lever 8 is loosely but directly connected the longer of the two connecting-rods *v*, and to the same said arm is indirectly connected the shorter of the two connecting-rods *v*, said shorter rod, where slotted, being first loosely connected to the lever 6, fulcrumed at 61 upon a suitable fixture 62 of the box *g* and seated upon a plate 63, supported by balls 64, said lever 6 being in turn connected by the rod 7 to the said crank-lever 8 at a point near to the connections of the longer rod *v*. The slots 5 are so related to the pivotal connecting-pins 51 of the levers 6 and 8 and cooperating parts as that when one of the shifting-levers is depressed and its connecting-rod *v* is moved longitudinally to effect a turning of the switch-tongue the pivotal pin 51 of the other connecting-rod will throw the levers 6 8 to a second position with the switch-tongue, and the said rod immediately returns to a normal position, leaving said levers 6 8 as thrown. The slots 5 5 permit a reciprocal movement of the lever 8 with the switch-tongue when power is applied to the latter without effecting a movement of the connecting-rods *v* and their connections in the boxes *j*, and should the said rods or connections become clogged and inoperative the said switch-tongue can be turned easily by hand in the manner now common, and thus no delay to the car will result from such clogging or inoperativeness.

To draw the connecting-rods *v* to their normal positions, I have provided springs 9, which are held on suitable supports 10 in the box *g* and engage suitable bearings 11, adj- justably fastened on the rod *v*, so as to force the said rods *v* back after having been moved by the shifting-lever and raise said shifting-levers to their normally-raised position.

To prevent the shifting-levers *h* from being pressed down beyond a proper limit by some unusual vehicle or weight on the road-way being brought to bear thereon, I have provided stay projections 12, cast upon sides of the boxes or extending up from the bottoms thereof in any manner suitable to secure sufficient strength to take such weight as might come upon it, and thus prevent injury to said lever or its connections.

The boxes are so disposed as to lie for the most part six or eight inches beneath the level of the road-bed, so that the usual paving-stones may be laid above the same, and thus when the device is in operative position only the plates or covers *h*³ for the shifting-levers of the boxes *j* and the covers 14 15 of the box *g* appear flush with the road-bed.

The boxes *j* *g* may be open at the bottom to permit a quick drainage of any water that

may enter from the surface; but should water enter no material damage will be done thereby except in the event of freezing, in which case the switch can be operated by hand temporarily, as above indicated.

The connecting-rods *vv* are each provided also with a stop-collar 16, adapted to engage cooperating stops 17, by means of which the said connecting-rods *v* are prevented on their return movements from again shifting the bell-crank lever.

In operating the device the car as it moves forward on the track toward the switch is brought in contact with one or the other of the shifting-levers by the action of the motorman pressing upon a suitable operating device on the car. This operating device (not shown) will possibly be the subject of another application for a patent.

Having thus described the invention, what I claim as new is—

1. The combination with the main and branch rails and switch-tongue, of a box *g*, having a crank-lever fulcrumed therein, and a second lever fulcrumed adjacent to the said crank-lever, the two levers being pivotally connected by a connecting-rod, and two slotted connected rods, one of which is loosely connected to the crank-lever and the other to the second lever, springs for holding said slotted rods in normal position, and shifting-levers connected to said slotted rods at a distance from said switch and adapted to be depressed to effect longitudinal movements of said slotted rods, substantially as set forth.

2. The combination with the main and branch rails and switch-tongue, of a box *g*,

having levers 6 and 8, one of which is in connection with the switch-tongue and the other of which is connected to the first by a connecting-rod 7, of slotted connecting-rods *v*, *v*, one connected with one lever and the other with the other lever, springs holding the last said connecting-rods in normal position, boxes *j*, arranged at a distance from the box *g*, levers *r*, arranged in said boxes, crank-levers arranged in said boxes connecting-rods *q*, and shifting-levers projecting up from said boxes *j*, and adapted to be depressed to effect a shifting of the switch-tongue, substantially as set forth.

3. The combination with the main and branch rails and switch-tongue, of a box containing levers, one of which is in connection with the switch-tongue and the other of which is connected to the first by a connecting-rod, of a long and a short connecting-rod, which connect one with one lever and the other with the other lever, springs holding said last connecting-rods in normal position, boxes *j*, *j*, arranged at different distances from the first said box and containing levers *r*, to the end of each of which one of said long and short rods is connected, and means in connection with said levers *r*, to be operated by or from the car, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 26th day of January, 1901.

FREDRICK G. SMITH.

Witnesses:

THEODORE MACK,
THEO. MACK, Jr.