

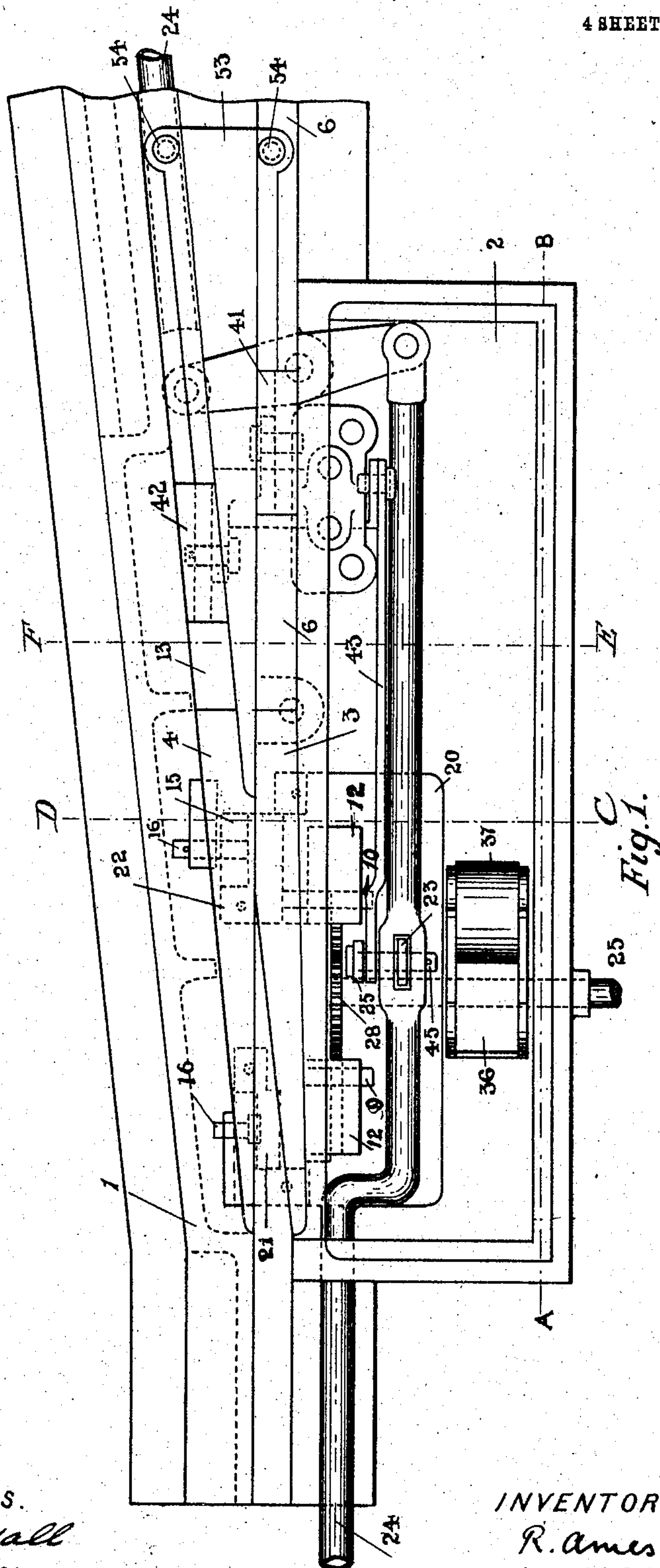
No. 781,121.

PATENTED JAN. 31, 1905.

R. AMES.  
POINT FOR GROOVED RAILS.

APPLICATION FILED APR. 28, 1904.

4 SHEETS—SHEET 1.



WITNESSES.  
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4 SHEETS—SHEET 2.

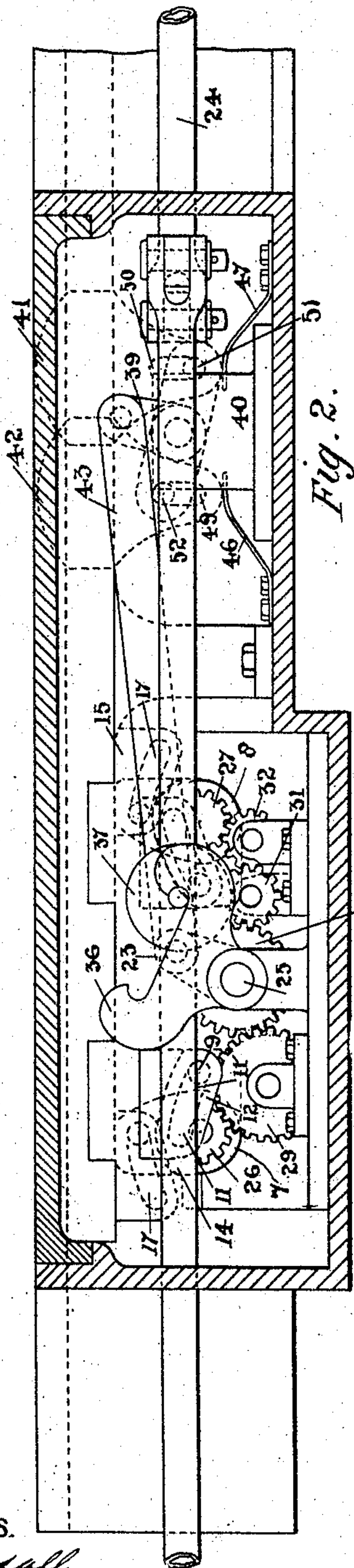


Fig. 2.

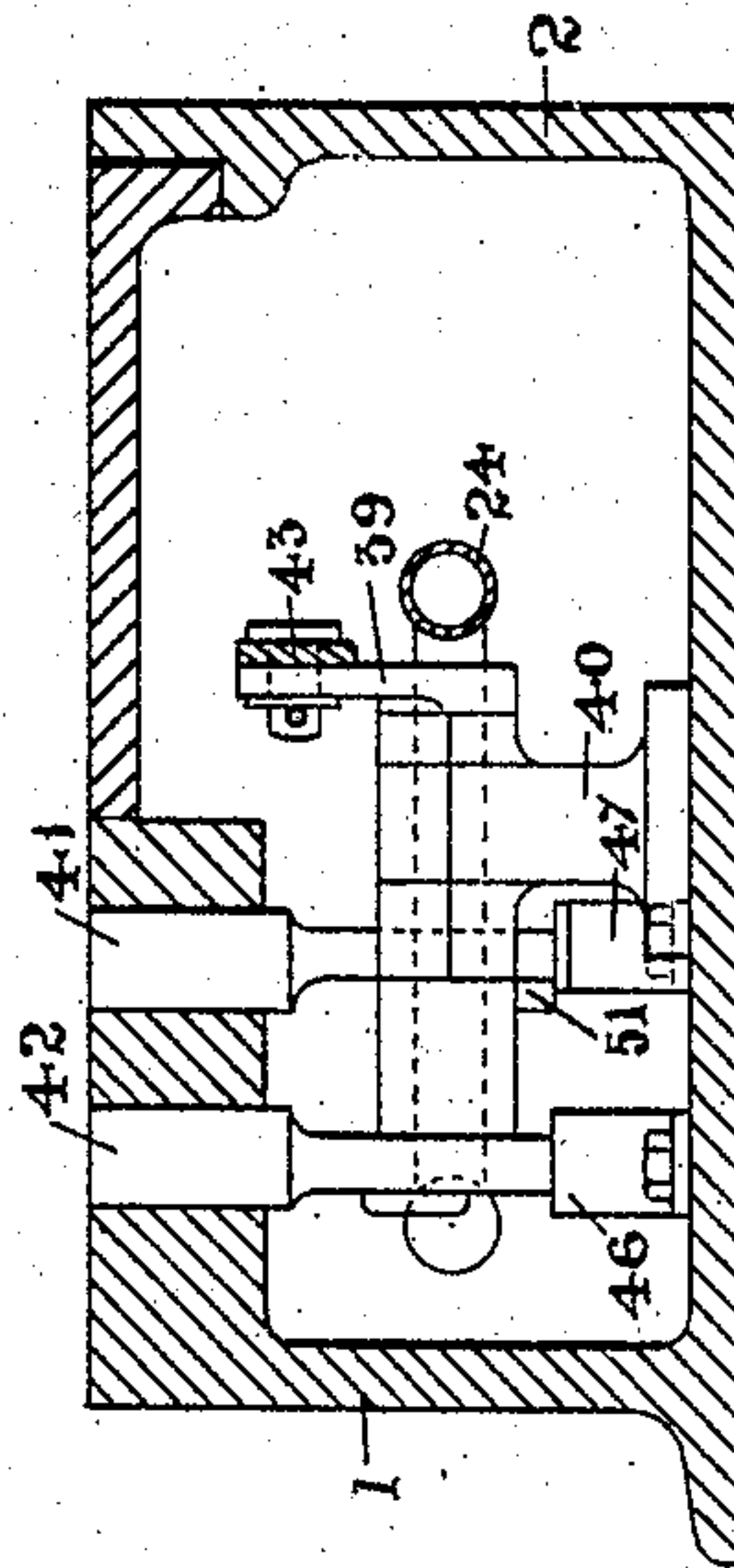


Fig. 4.

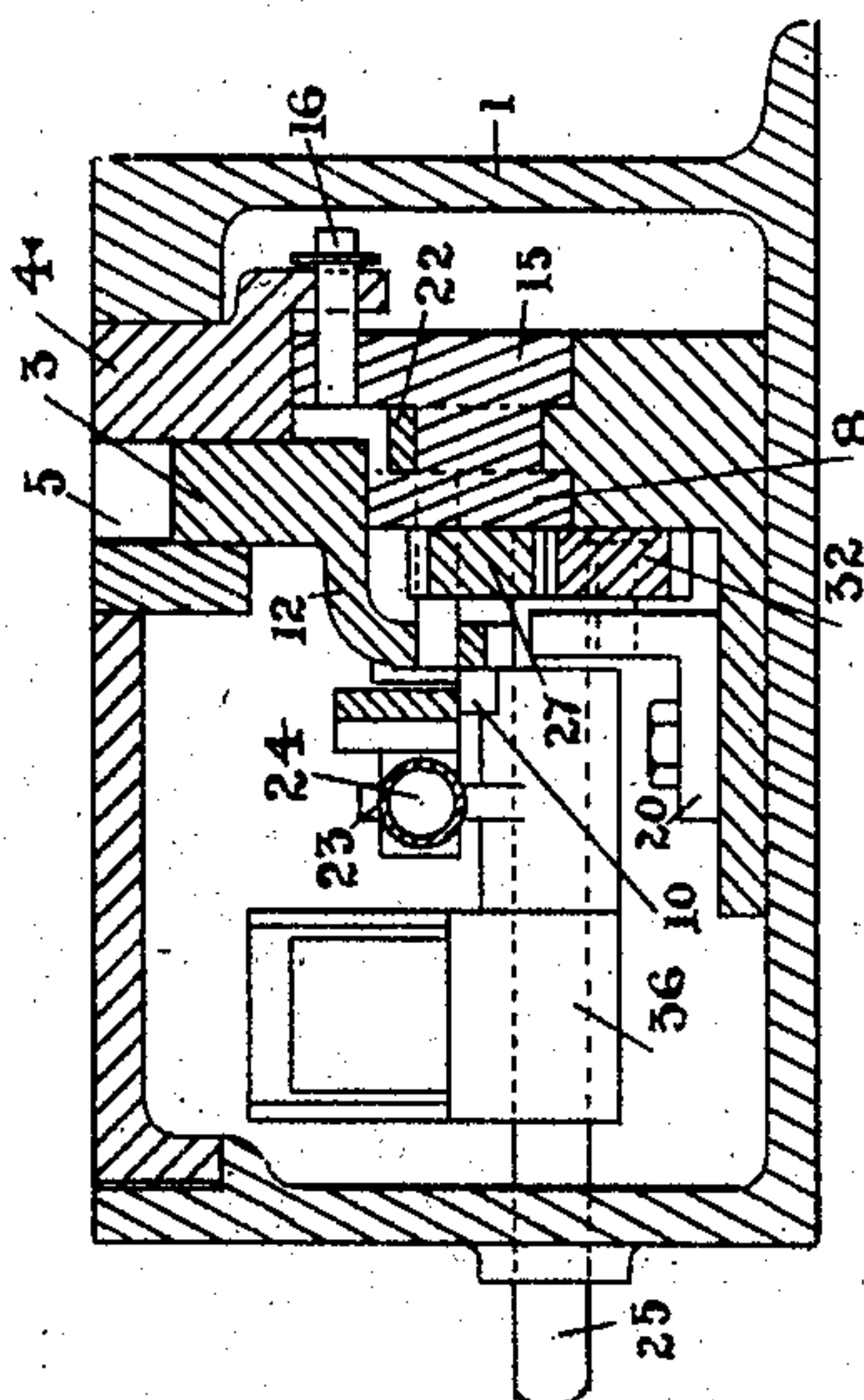


Fig. 3.

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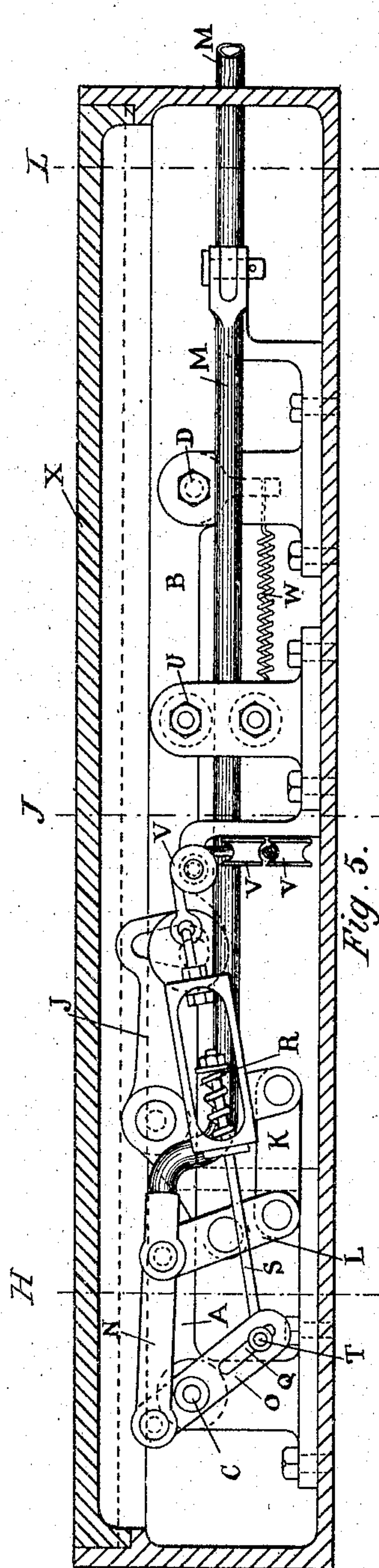


Fig. 5.

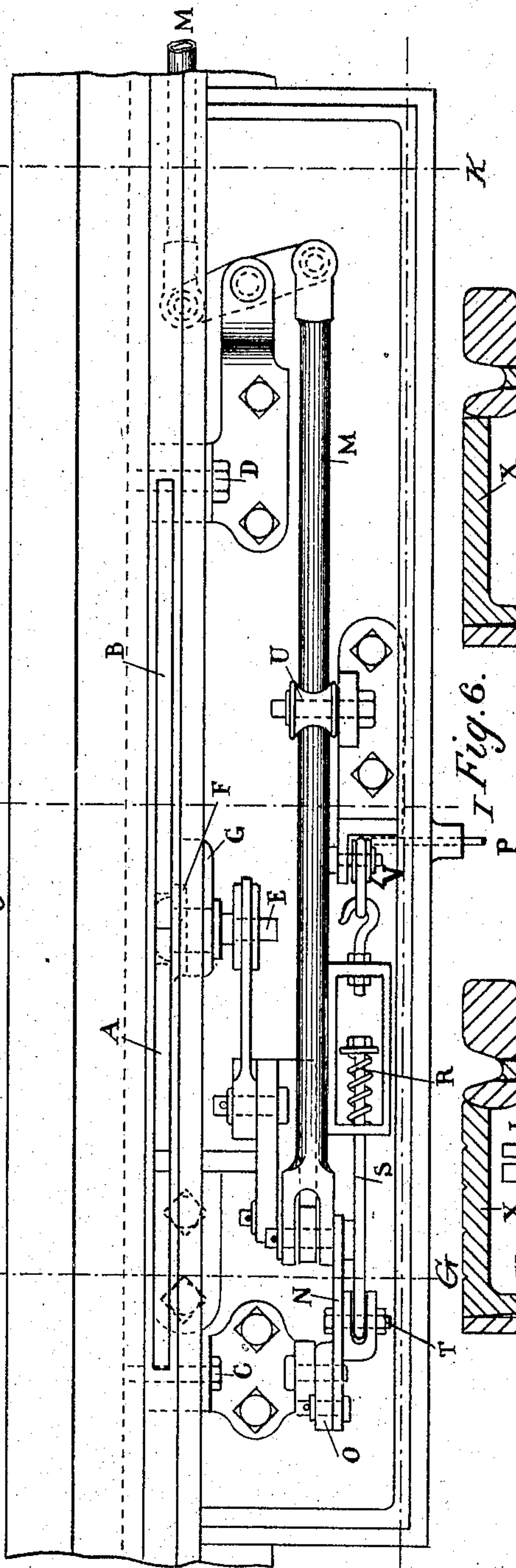


Fig. 6.

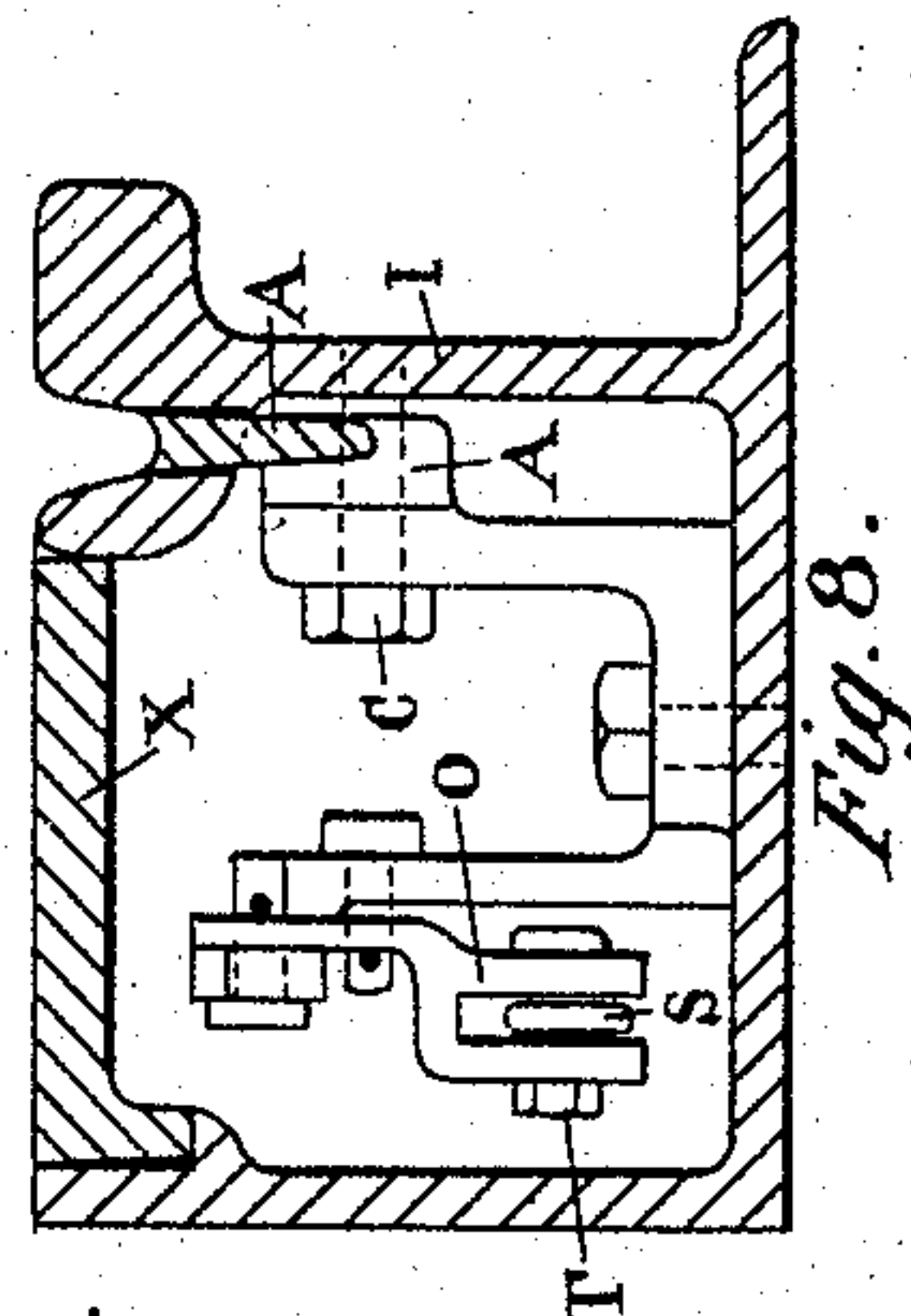


Fig. 8.

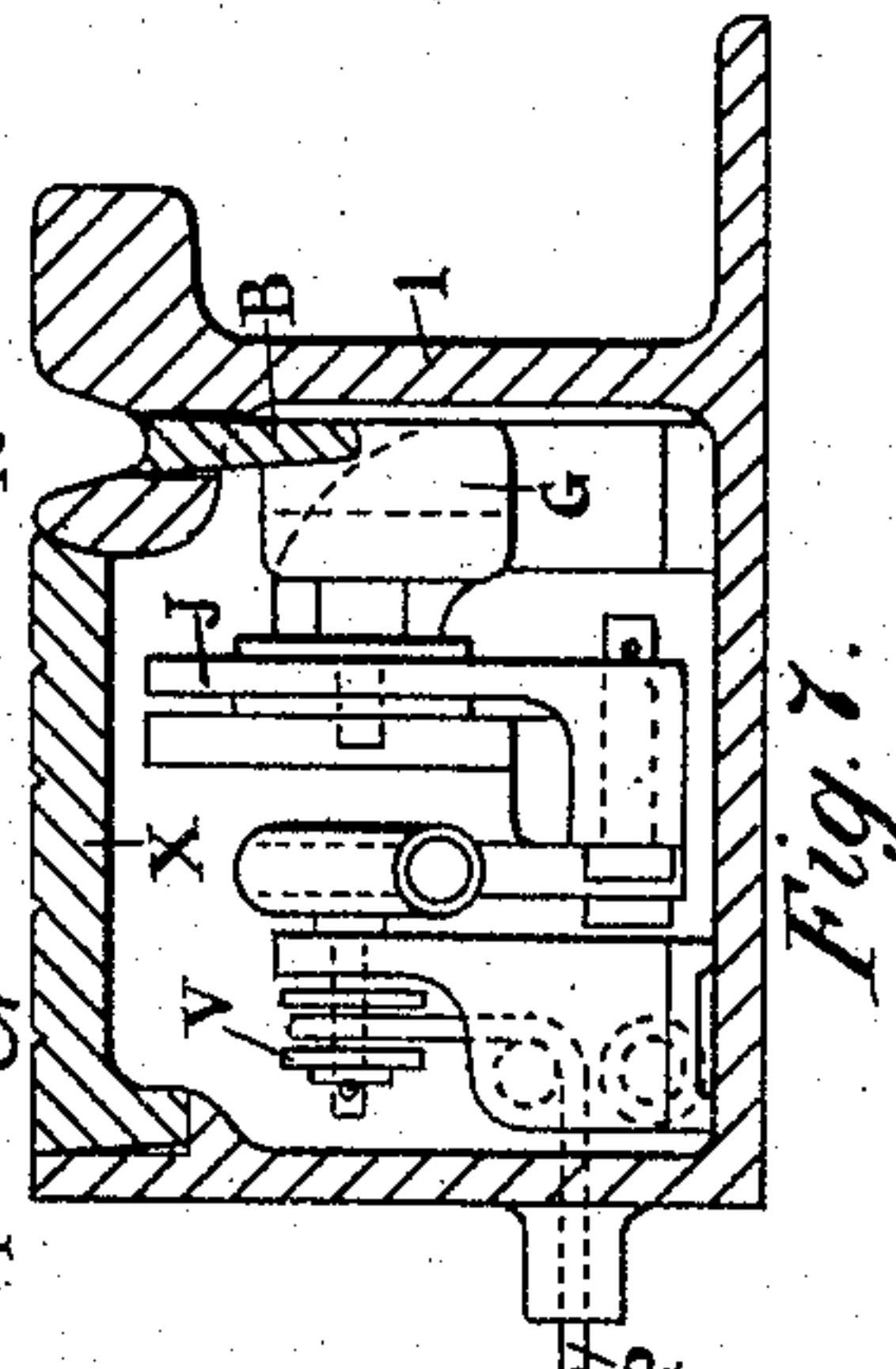


Fig. 7.

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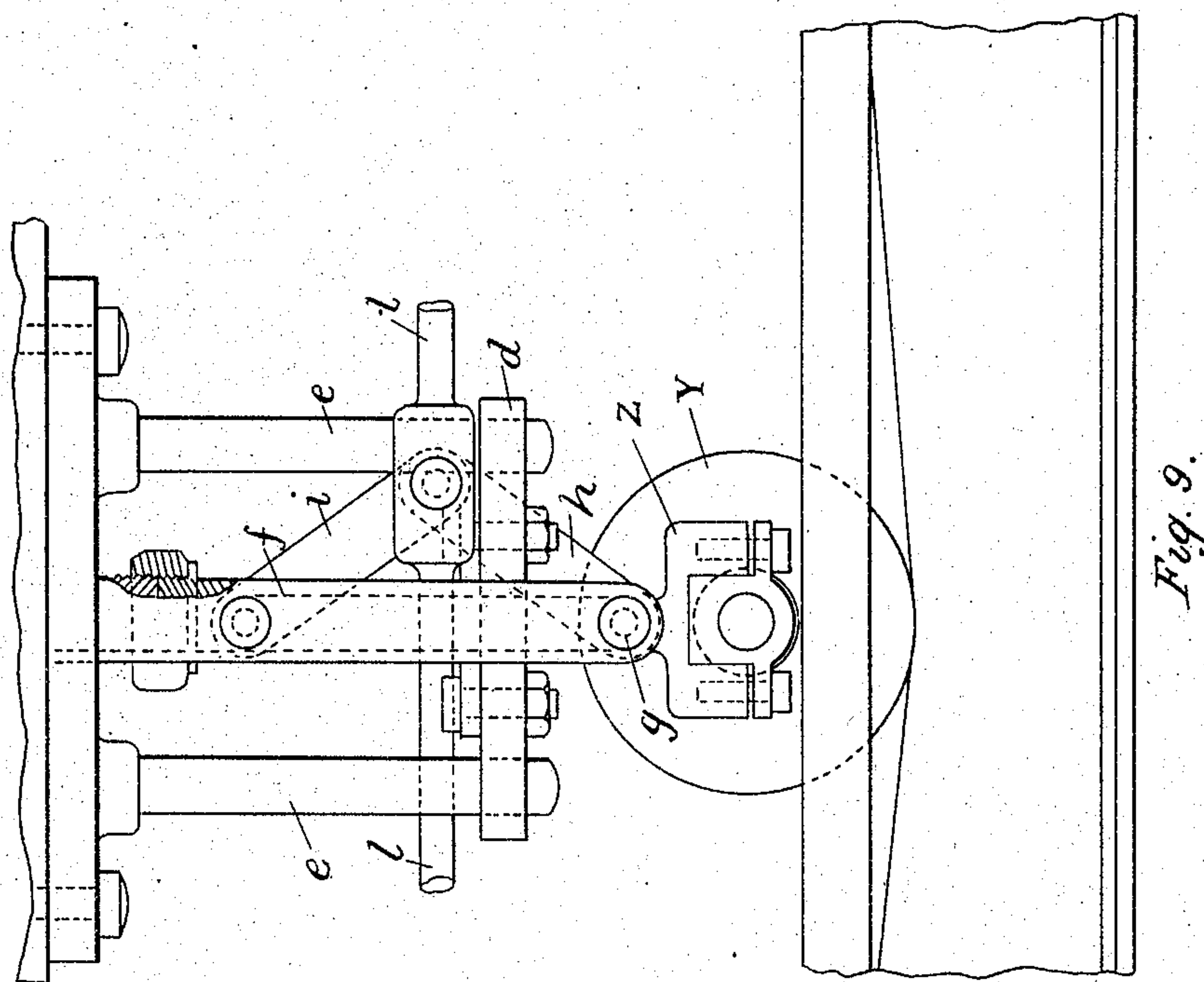
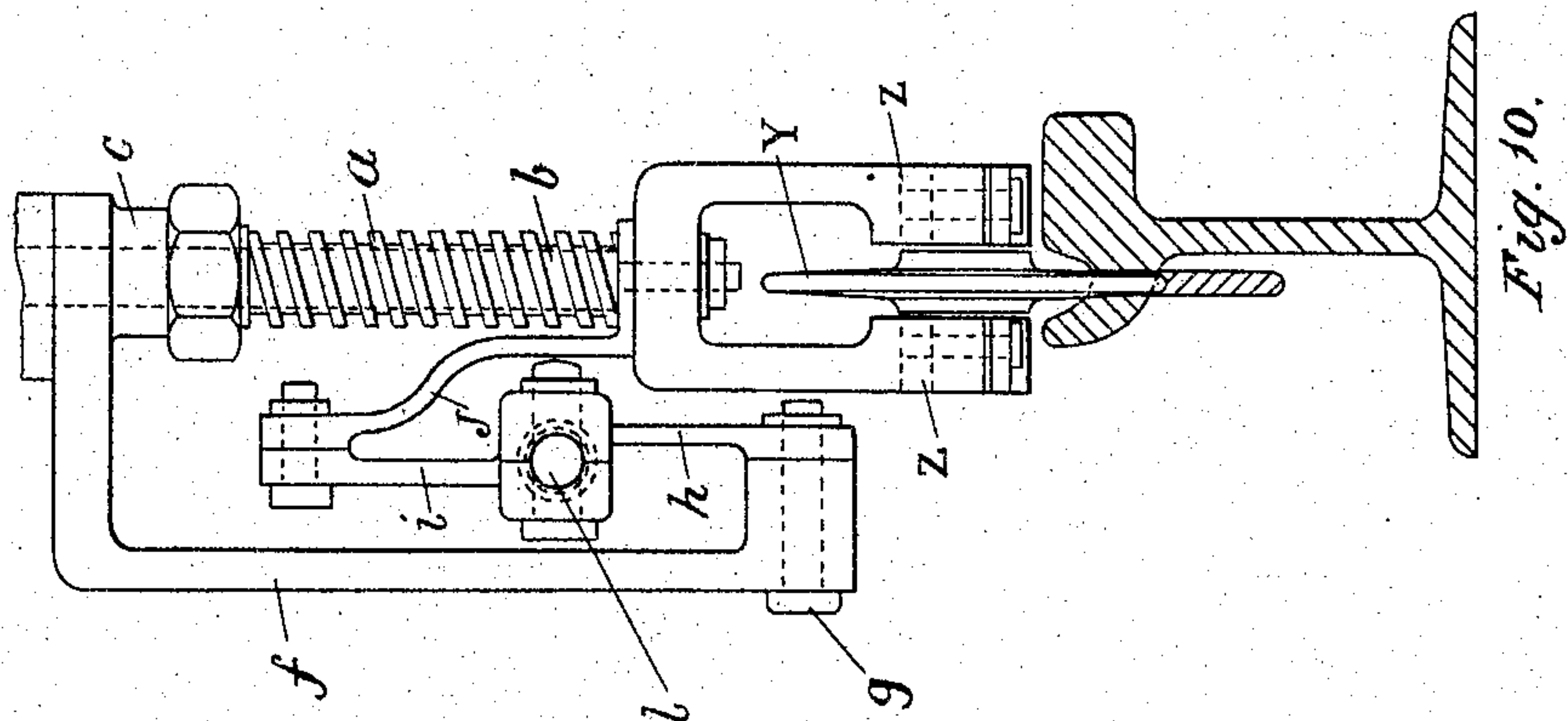
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4 SHEETS—SHEET 4.



WITNESSES.

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# UNITED STATES PATENT OFFICE.

RICHARD AMES, OF WESTMINSTER, ENGLAND.

## POINT FOR GROOVED RAILS.

SPECIFICATION forming part of Letters Patent No. 781,121, dated January 31, 1905.

Application filed April 28, 1904; Serial No. 205,360.

*To all whom it may concern:*

Be it known that I, RICHARD AMES, a subject of the King of Great Britain, residing at 7 Victoria street, Westminster, England, have invented new and useful Points for Grooved Rails, of which the following is a specification.

My invention relates to points for the permanent way of tramways, light railways, and similar roads where grooved rails are used to form the track; and the objects of my improvements are: to dispense with the usual points, the tongues of which slide horizontally or rise and fall radially; to provide point tongues or guides arranged to rise and fall vertically and parallel to the level of the rails; to enable the point tongues or guides to work freely under all conditions of weather without becoming choked or jammed by snow, frost, loose stones, sticks, or mud; to make all parts liable to become worn easily renewable; to enable the point tongues or guides to be operated from or by a car traveling in either direction either automatically or by the driver without leaving the driving-platform; to insure the point tongues or guides being held in the proper position until the car or train has passed over them; to enable the point tongues or guides to be applied both to the inside and to the outside rail of each track, if desired, the point tongues or guides of each track being operated by the hereinafter-described mechanism, which mechanism may be attached to the inner or to the outer rail, and to enable the overhead switches of the trolley-wires to be operated at the same time as the points in the permanent way. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 represents plan of points for a tramway constructed according to this invention. Fig. 2 represents a sectional elevation of same on line *v v*. Fig. 3 is a cross-section of same on line *w w*. Fig. 4 is a cross-section of same on the line *x x*. Fig. 5 is a sectional elevation of apparatus for actuating the points when the same are controlled from the driving-platform. Fig. 6 is a plan of same. Fig. 7 is a section of same on line *y y*. Fig. 8 is a section of same on line *z z*. Fig. 9 is a side elevation of the controlling apparatus which

is attached to the car. Fig. 10 is an end elevation of same.

Similar numerals and letters denote similar parts throughout the several views.

Now according to this invention I provide a casting, of steel or other suitable material, forming the point-rail 1, and also a box or case 2 to contain the actuating mechanism. The point tongues or guides 3 and 4 are made of any suitable material, preferably forged steel or manganese steel, and rise and fall in a slot 5 in the point-rail 1, one point tongue or guide being in its highest position and blocking the groove of one track while the other point tongue or guide is in its lowest position, leaving the groove of the other track free. The point tongue or guide 3, which when raised blocks the groove of the main road 6, is raised and lowered and supported by cams 7 and 8, said cams being fitted with pins 9 and 10, which engage with slots 11 11 in projections 12 from the under side of the tongue or guide 3. The point tongue or guide 4, which when raised blocks the groove of the side track 13, is actuated and supported by similar cams 14 15, these cams being fitted with pins 16 16, which engage with slots 17 17 in projections from the under side of the point tongue or guide 4. The cams 7 and 14 are cast or forged in one piece and rotate in a bearing in the piece 18, the bottom of the cams also being supported in concaves in the piece 18. The cams 7 and 14 are at right angles to each other. The cams 8 and 15, which are also at right angles to each other, are also cast or forged in one piece and rotate in a bearing in the piece 19, the bottom of the cams being further supported in concaves in the said piece. The pieces 18 and 19 form part of the bracket 20. 21 and 22 are the caps of the bearings in the pieces 18 and 19, respectively. The cams are constructed in such a manner as to lift and lower the point tongues or guides vertically, the said tongues or guides when in motion remaining horizontal or parallel to the level of the rails. As shown, each pair of cams actuating the same tongue are parallel to each other, and the cams actuating the other tongue are also parallel to each other and at right angles to the other pair, so that as one pair of cams



raises one tongue the other pair of cams allow the other tongue to fall, or, if need be, depress it by means of the pins and slots if the tongue does not fall by its own weight. The

5 two pairs of cams move in opposite directions—that is to say, the cams 7 and 8 rotate outward to raise the tongue 3 and rotate inward to lower the same, while the cams 14 and 15 rotate inward to raise the tongue 4 and rotate  
10 outward to lower the same.

23 is a double-armed lever which is oscillated by the point-rod 24. The lever 23 is keyed or cottered to a rod or tube 25, which passes under the roadway to the other rail  
15 and operates the tongues on the other rail of the permanent way by means of cams and gearing.

I secure to the cams 7 and 8 spur-pinions 26 and 27, and I key to the rod or tube 25 a  
20 spur-wheel 28, which is double the diameter of the pinions, as the rod or tube 25 only oscillates through an angle of forty-five degrees, while the cams move through an angle of ninety degrees. The pinion 26 is geared to  
25 the wheel 28 by means of an intermediate wheel 29, which rotates on a stud or pin in the bracket 30. The pinion 27 is geared to the wheel 28 by means of two intermediate pinions 31 and 32, so as to compel the cams to  
30 rotate in opposite directions. The pinions 31 and 32 rotate on studs 33 and 34 in the bracket 35.

To operate the points quickly and to prevent accidental displacement thereof through  
35 vibration as the cars pass over them, I attach to the rod or tube 25, by keying or otherwise, a rocking trough 36, in which rolls a weight 37, the said weight assisting in moving the points when it has passed the center of oscillation and preventing accidental movement  
40 of the tongues when at either end of its travel. The rocking trough 36 and the lever 23 may be made in one piece, if preferred.

38 is a bearing for the end of the tube or  
45 rod 25.

Instead of the trough 36 and weight 37 I may use a weighted lever or "tumbling-bob."

To allow the cars to be backed, if necessary, when the points are against them or when  
50 the points are required to act as trailing points, I provide a lever 39, having two horizontal arms and one vertical arm, the said lever being supported in a suitable plumber-block 40, which is bolted to the bottom of the  
55 case 2 containing the mechanism. To one of the horizontal arms of the lever 39 is attached a treadle 41, which projects through a slot in the groove of the main road, and to the other horizontal arm of the said lever is attached a  
60 treadle 42, which projects through a slot in the groove of the side track. To the vertical arm of the lever 39 is attached one end of the link 43 by the pin 44, the opposite end of said link being attached to the lever 23 by means of  
65 the pin 45. The treadles are normally raised

to the level of the rails by means of springs 46 47, the treadles being provided with slots 49 50 to receive the pins 51 and 52, which are secured in the horizontal arms of the lever 39.

As shown by Figs. 1 and 2, the main line 70 is clear and the side-track tongue raised, the pin 52 in the lever 39 is at the top of the slot in the side-track treadle 42, while the pin 51 is at the bottom of the slot in the main-line treadle 41. Consequently the wheel-flange of 75 a car passing over the main track will simply depress the treadle without affecting the points, whereas should a car be backed from the side track on the main line the flange of the wheel of the car passing over the treadle 42 will depress it and the arm of the lever 39, the movement of the lever 39 being transmitted by the link 43 to the lever 23. The position of the point-tongues will be reversed, the tongue or guide which is against the car 80 will be depressed, and the other tongue or guide raised, leaving the road clear for the car on to the main road. If the points are operated by the car-drivers without leaving the driving-platform, the point-rod 24 extends in 90 both directions and is connected at each end to an actuating device, one actuating device being a suitable distance behind the points and the other similar actuating device in front of the points clear of the crossing. 95

The V-shaped piece 53 between the two rails being liable to great wear and tear is preferably made renewable, so that when worn it may be removed by unscrewing the bolts or screws 54, which keep it in position, and a new piece put in its place. 100

The point tongues or guides are carefully fitted into their respective slots, thus avoiding any openings to the surface of the street either when at rest or when in operation, 105 which would give access to mud or snow to the working parts. The action of the tongues or guides rising and falling vertically in a close-fitting slot and remaining horizontal during the motion makes it impossible for the point 110 to be rendered inoperative by stones, sticks, mud, or other obstructions which would jam sliding and other point-tongues, as my point tongues or guides simply lift any obstructions resting upon them as they rise. 115

In some cases I may fit points to one rail only, as is common practice in tramway-work, the other rail being fitted with a fixed tongue or guide, which allows the car to pass from one track to the other. 120

The apparatus for enabling the driver of a tram-car to move the points and trolley-switch without leaving the driving-platform is shown by Figs. 5 to 10, in which is shown a portion of a tramway-rail having a slot in the bottom of 125 the grooved portion thereof and a box to contain the mechanism cast integral with the rail. If preferred, the box may be made separate from the rail and bolted thereto. Projecting through the slot, so that the upper sur- 130



faces are flush with the bottom of the rail-groove, are two levers A B, which are supported at one end by suitable pins C D, on which the said levers are free to oscillate, the other ends of the said levers being connected together by a pin E, passing through suitable bosses F G on the levers. In order to prevent dirt, mud, and the like from getting between the levers A B and the slot and between the meeting ends of the levers, I make the levers to fit the slot in the rail sidewise and I make the ends of the levers which are in contact with the ends of the slot of such a shape that they will when the levers are deflected by a passing car always remain in contact with the ends of the slot. To enable this to be accomplished, I make the holes H I in the ends of the levers elliptical or approximately elliptical instead of circular, so as to allow the levers to slide on the pins C D, the pins being circular, as usual. The meeting ends of the levers are half-lapped, and the holes in the half-lapped bosses are also elliptical or approximately elliptical. The pin E, which connects the ends of the levers to each other, passes also through the horizontal arm of a bell-crank lever J, the vertical arm of which is connected, by means of a link K, to a rocking lever L, which operates the point-rod 24. To the said rocking lever is also connected, by means of a link or links N, a second rocking lever O with unequal arms, which by means of a cord or rope P (preferably of wire) operates the overhead switch on the trolley-wire. The motion of the cord or rope P may be varied, and tension of the rope or cord may also be adjusted so as to give the exact amount of movement required to the overhead switch, it being understood that the apparatus is designed to give the correct motion to the point-tongues, and as the motion of the overhead switch may or may not coincide with the motion of the point-tongues it is necessary to introduce an adjustment in order that both the points and the switch may be moved the correct distance by the deflection of the levers. The adjustment of the motion is obtained by means of the slot Q in the lever O and the tension by means of the spring R, surrounding the rod S, which is connected to the bolt T in the slot Q. Suitable guide-rollers U V are provided for the point-rod and for the switch-rope. The levers are held in the normal position by a suitable spring or springs W or by a weight or weights. The whole mechanism is supported by suitable brackets formed in one with or bolted to the box in which the mechanism is inclosed. The box is provided with a water-tight inspection-cover X, giving free access to the mechanism for inspection, oiling, and other purposes. The box is fitted to the rail in such a manner as to prevent dirt, dust, water, and other matters from entering the box in cases where the box is separate from the rail. The levers are deflected by means of a wheel Y,

which runs in the rail-groove. This wheel is supported in a fork Z, which is forced downward by means of a spring *a* or springs, preferably by means of a helical spring surrounding the fork-spindle. The fork Z is free to move vertically, the upper end of the fork-spindle *b* being guided in a suitable socket *c*. The lower portion of the fork-spindle is secured to a suitable cross-head *d*, which moves in or on suitable vertical guides *e e*. To the bottom of the car is bolted a bracket *f*, which carries the guide for the upper end of the fork-spindle. This bracket also carries a pin *g*, which supports the lower, *h*, of two toggle-levers, to the upper, *i*, of which levers is connected a bracket *j*, which is also attached to the fork carrying the point-wheel. To the center joint of the toggles is attached a rod *l* or rods, which is or are attached to levers or treadles at each end of the car to enable the apparatus to be worked from either platform. The said levers or treadles are provided with ratchets or other suitable devices to compel the point-wheel to remain out of contact with the rail-groove without attention on the part of the driver after it has been raised to the proper height.

The action of the apparatus is as follows: Assuming the points to be set to allow the cars to travel along the main road and a car is approaching which requires to be switched onto the side track, on approaching the points to be moved the driver releases the treadle or lever and allows the point-wheel to press on the bottom of the rail-groove. When the point-wheel passes over the levers, they are deflected and the point-rod 24 moved. The motion of the point-rod moves over the lever 23 and by means of the cams and gearing hereinbefore described depresses the side-track tongue or guide and raises the tongue or guide in the main road. The car guided by the wheel-flanges in contact with the raised point tongues or guides is forced onto the side track, and when the car is clear of the crossing the points are reset for the main road either by the pointsman or by the actuating mechanism controlled by the driver. If now from any cause the car has to be backed from the side track into the main road or in cases where two main lines converge into one line, the flange of the car-wheel depresses the treadle or treadles in the side track and depresses the tongue or guide which is against the car, as hereinbefore specified, thus leaving the road clear for the car to pass from one track to the other.

In cases where two lines converge into one instead of using trailing points or spring-actuated points I provide treadles and linkwork both in front of and behind the points in order that the car may automatically operate the point tongues or guides by means of the wheel's flanges or by the point-wheel, which depresses the treadles, leaving the points



properly set without the aid of point-rods or further manipulation of any kind.

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

5 1. In points for grooved rail-tracks the combination of tongues or guides having a vertical motion, with cams for imparting motion to the tongues or guides, pins in the cams engaging with slots in the tongues or guides, a  
10 forked lever oscillated by a point-rod, links connecting cams to said lever, and a rocking trough and rolling weight all substantially as specified and for the purposes stated.

2. In points for grooved rail-tracks having  
15 vertically-moving tongues or guides actuated by cams, rotating said cams by means of spur-gearing set in motion by the rotation of the rod or tube to which is secured the lever connected to the point-rod, all substantially as  
20 specified.

3. In points for grooved rail-tracks having vertically-moving tongues or guides operated by cams the means for setting the points by means of the wheel-flanges, which means consist of treadles working in slots in the rail and reaching to the level of the rails, a T-shaped  
25 lever to the horizontal arms of which the treadles are attached, and a link connecting the vertical arm of the said lever to the lever giving motion to the cams, all substantially  
30 as specified for the purposes stated.

4. In points for grooved rail-tracks having vertically-moving tongues or guides the combination of two levers working in a slot in the  
35 bottom of the rail-groove the deflection of which levers when the car passes over them actuates a bell-crank lever which latter by

means of linkwork connected thereto moves the point-rod and a cord or rope attached to the trolley-switch as specified. 40

5. In points for grooved rail-tracks having vertically-moving tongues the combination of two levers working in a slot in the bottom of the rail-groove, a bell-crank lever the horizontal arm of which is depressed by a pin secured to one of said levers, a rocking lever  
45 connected by means of a link to the vertical arm of the bell-crank lever, a point-rod connected to said rocking lever, an adjusting-lever with unequal arms connected by linkwork  
50 to aforesaid rocking lever, a tension device attached to long arm of adjusting-lever, and a cord or rope to connect the tension device to the overhead-trolley switch as specified.

6. In points for grooved rails having vertically-moving tongues the combination of a wheel adapted to run in the rail-groove, a fork carrying said wheel, a spring to depress said wheel, guides to compel the fork to move vertically, toggle-levers connected to said fork  
60 and to a bracket bolted to the bottom of the car, a rod running from end to end of the car connected to said toggle-levers, and a lever or treadle at each end of the car connected to said rod, all substantially as specified and for  
65 the purpose stated.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

RICHARD AMES.

Witnesses:

T. E. HALFORD,  
GEORGE NEWBERRY.