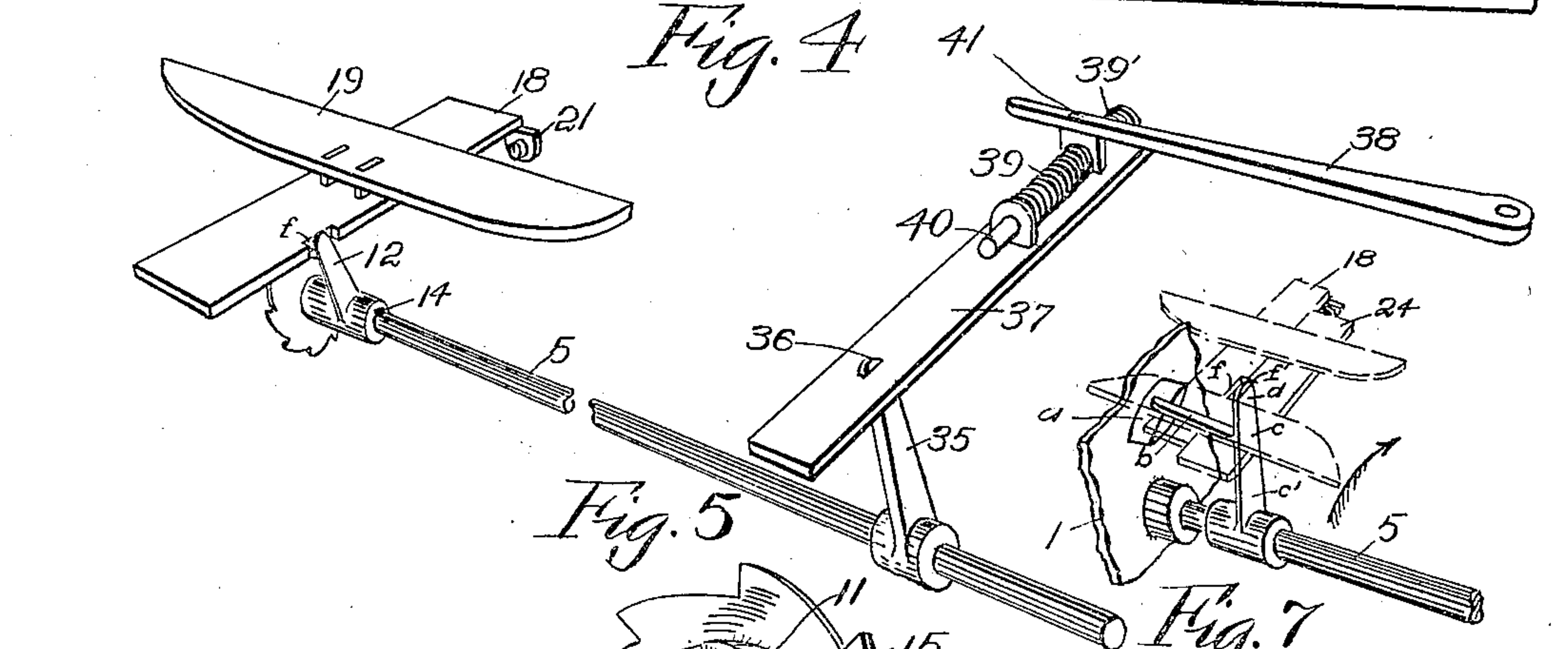
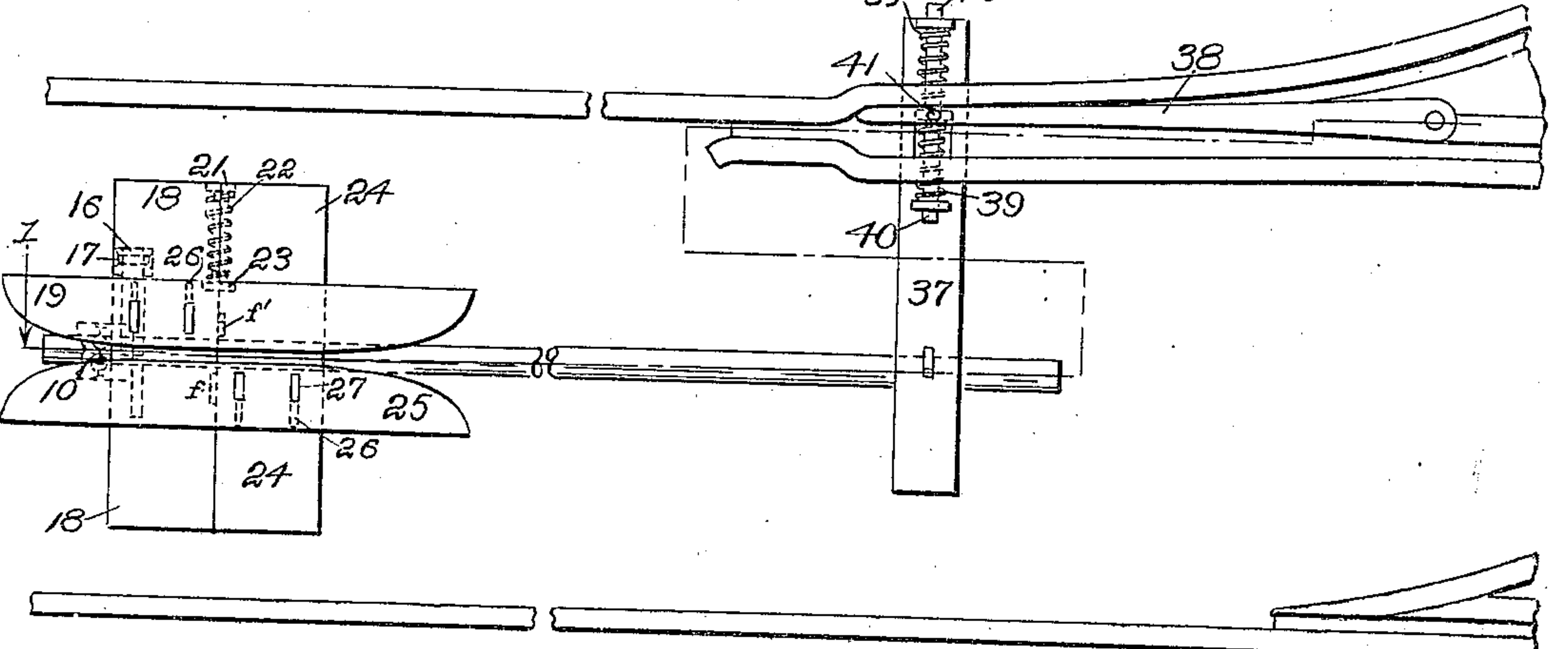
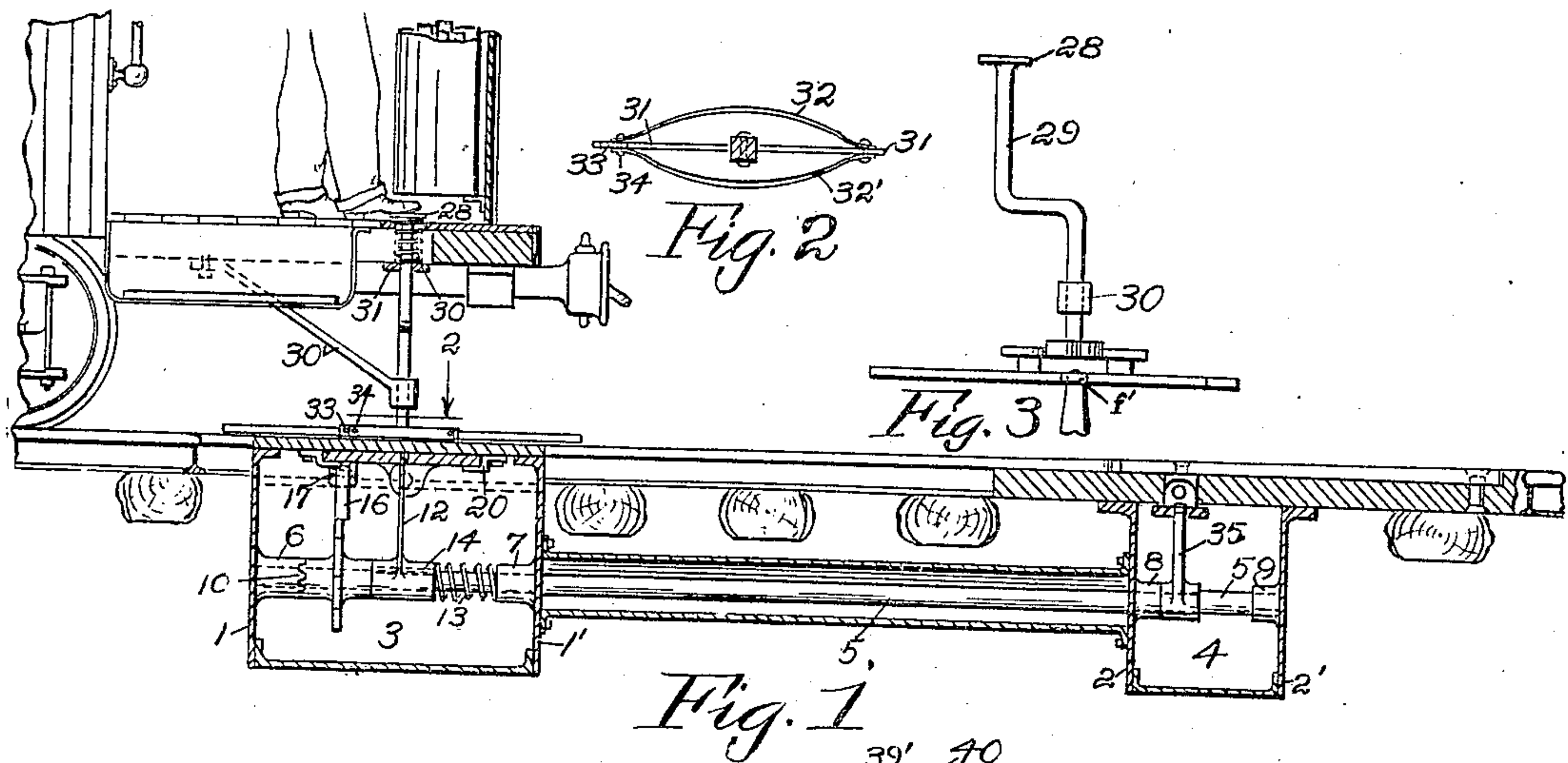


No. 832,243.

PATENTED OCT. 2, 1906.

H. DENNIS.
AUTOMATIC SWITCH.
APPLICATION FILED JAN. 24, 1906.



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Fig. 6

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HARVEY DENNIS, OF SEATTLE, WASHINGTON.

AUTOMATIC SWITCH.

No. 832,243.

Specification of Letters Patent.

Patented Oct. 2, 1906.

Application filed January 24, 1906. Serial No. 297,614.

To all whom it may concern:

Be it known that I, HARVEY DENNIS, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented new and useful Improvements in Automatic Switches, of which the following is a specification.

My invention relates to automatic switches in which the switch-tongue is thrown from the platform of a car while approaching or leaving a switch. By the mechanism shown it is desired that many of the working parts be incased to prevent becoming clogged or obstructed from particles from the pavement or roadway and, as here shown, is adapted to street-cars, but may be used advantageously for most forms of railways.

In my invention I have provided a switch-throwing device which has but few parts exposed above the pavement or road-bed and by its simplicity will obviate the necessity of using nicely-finished and in some cases delicately-adjusted parts, thus requiring little expense in their making.

By the construction shown the operator of a car wishing to throw the switch-tongue does not have to check the speed of the car beyond that customary in entering switches.

I have shown in the accompanying drawings casings made of metal and supporting the bearings and rails, having portions exposed above the ballast and on a plane with the pavement of a street or road-bed. These bearings may be supported by other means, such as shaft-bearings common in use and having for their foundation blocks of wood or masonry, and the rails above the working parts may be supported by ties or means common to any other portion of the track. I, however, prefer to have the parts which are beneath the pavement or road-bed incased with metal and to be made of sufficient strength to withstand severe use and to keep said underground parts free from all moisture and dirt.

I desire to have the switch tongue and shifter yield to sudden blows and to be proof against being broken by the clogging of parts which are exposed above the pavement or road-bed.

I attain these features by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a fragmentary elevation and section of the front platform of a street-car

and a vertical longitudinal section taken at 1, Fig. 4. Fig. 2 is a plan view and partial section at 2, Fig. 1. Fig. 3 is a front elevation of the portion of my device which is carried by the car and members which are directly operated by it. Fig. 4 is a plan view of the moving parts and rails with the casing removed. Fig. 5 is a perspective view of a part of the working parts, the rock-shaft complete, and one of the adjusting members, and the switch-tongue and the switch-tongue throwing-bar. Fig. 6 is a perspective view of the ratchet and lateral shifting-cam. Fig. 7 is a perspective view of a modification which may be used in place of the lateral shifting-cam shown in Fig. 6.

Similar characters refer to similar parts throughout the several views.

The plates 1 and 1' 2 and 2' serve to inclose the ends of the casings 3 and 4 and serve to support the shaft 5 by means of bearings 6, 7, 8, and 9. On the end of the bearing 6 is found a cam consisting of projections 10, which are adapted to mesh in inversely like-shaped indentations 10', which constitutes a lateral shifting-cam 11 and may be loosely mounted on a shaft 5 to operate the spring-lever 12 against the spring 13. The spring-lever 12 is slidably mounted and reciprocates the shaft 5 by means of a feather-key 14. The lateral shifting-cam 11 carries a ratchet 15, which is cast integral thereto and is operated by the pawl 16, which is carried from lugs 17 and 17', which are rigidly secured to the under surface of the switch-adjusting plate 18, which also carries a switch-adjusting member 19.

The switch-adjusting plate 18 is slidably mounted on the top and inner surface of the casing 3 by means of guides 20. The switch-adjusting plate 18 is provided on one end with a boss 23, cast integral with another switch-adjusting plate 24. The switch-adjusting plate 24 is provided on its upper surface with switch-adjusting members 19 and 25. Said switch-adjusting members 19 and 25 are exposed above the pavement and are permitted to travel because of slots, such as 26, which are adapted to loosely fit pins, such as 27, which connect the switch-adjusting member 25 to 24 and 19 to 18.

Projecting above the platform of the car is a pedal which is formed on the upper end of the vertically-disposed shifting-rod 29, yieldingly supported by means of a spring 30 and

plate 31, which is attached to the substructure of the car-platform. The shifting-rod 29 is guided by means of a hanger 30' and has attached to its lower end a bar 31, which carries the springs 32 and 32', which are fixedly secured thereto on the forward end relative to the end of the car and slidably secured to the other end of said bar 31 by means of a slot 33 and pin 34.

On the end of the shaft 5 nearest the switch-tongue 38 and in the casing 4 is rigidly mounted a lever 35, the end of which loosely engages in an aperture 36 in the switch-throwing plate 37, which yieldingly throws the switch-tongue 38 by means of springs 39 and 39', which are carried on a shaft 40, having rigidly attached midway its ends the switch-throwing pin 41. The switch-tongue 38 is pivotally mounted in the usual manner.

The modification shown in Fig. 7 has the lateral shifting-cam attached to the side of the casing 3 and is here shown as a cast-lug *a* and operates on a projection *b*, bending the lever *c*, which is rigidly secured to the shaft 5 at *c*, and said lever *c* is provided at its free end with a projection *d*, adapted to engage in notches *f* and *f'* in switch-adjusting plates 18 and 24, hereinafter described.

It is obvious that a car approaching the switch and the operator desiring to change the position of the switch-tongue 38 will by pressing on the pedal 28 throw the vertically-disposed shifting-rod 29 downwardly and overcoming the action of the spring 30 until just clearing the road-bed or pavement, and thus placing the springs 31 and 32, which are on the lower end of the vertically-disposed shifting-rod 29, in a position which when the car advances will enter a slot formed between the switch-adjusting members 19 and 25 and will separate said members 19 and 25, which are in a closed or normal position, and will overcome the spring 22, which is of sufficient power to throw the mechanism, as well as the switch-tongue, to either side desired. The springs 32 and 32' on first entering the slot heretofore described will be compressed in accordance with the velocity of the car on striking switch-adjusting members 19 and 25, but will as the car advances separate said switch-adjusting members 19 and 25, thus bringing the notches *f* and *f'* in coincidence by compressing the spring 22 opposite each other, as is shown in Fig. 7. The free end of the lever 12 will engage in either *f* or *f'* alternately relative to the opening and closing of the switch-adjusting members 19 and 25. The position of the lever 12 is determined by the ratchet-wheel 15, which is advanced one notch each time the springs 32 and 32' separate the switch-adjusting members 19 and 25. The ratchet-wheel 15 moves the longitudinal shifting-cam 11, which is provided with one-half the number of projections as there are teeth on the ratch-

et-wheel, and by these proportions it is obvious by moving ratchet-wheel one tooth will cause the projections on the cam 11 to rest upon like projections on the cam 6, which is held in the casing, and by the next movement will cause said projections on 11 to intermesh with indentations in the cam 6, so that by separating the switch-adjusting members 19 and 25 twice will cause the cam and all the parts to return to their original position, the cam 11, ratchet-wheel 15, and lever 12 having moved longitudinally of the shaft 5 and returned to their former position by the spring 13, cams 6 and 11 and the hubs of ratchet-wheel 15 and lever 12 being kept in contact by said spring 13.

It is obvious that the free end of the lever 12 cannot leave the notch *f* to engage in the notch *f'*, or *f'* to engage in the notch *f*, except when notches *f* and *f'* coincide, which is only at the time when the switch-adjusting members 19 and 25 are separated. The cams 11 and 6 will act on the hub of the lever 12, the lever being sufficiently thin and of the proper material that it may yield or be sprung until the switch-adjusting plate 18 and the switch-adjusting plate 24 have traveled to their extreme position, bringing the notches *f* and *f'* in coincidence, thus allowing the free end of the lever 12 to engage in the notch in the opposite switch-adjusting plate from which it has been carried to this position, and when said switch-adjusting plates have returned to their normal position because of the action of spring 22 said opposite adjusting-plate will have carried the free end of said lever 12, which is engaged in a notch of said switch-adjusting plate, as *f* and *f'*, with it. The lever 12, because of the feather-key 14, reciprocates the shaft 5 and lever 35, thus moving the switch-throwing plate 37 and switch-tongue 38.

The operation of the modification shown in Fig. 7 to accomplish the alternate lateral movement is actuated by the free end of the lever *c*, corresponding to lever 12 (shown in Figs. 1, 4, and 5) by means of the cam *a* acting on a projection on said lever *c*.

It is obvious that when the projection *d* is traveling in the direction of the arrow in the notch *f* that the projection *b* on the lever *c* will be forced upward by the inclination of the cam *a*, the projection *d* being at ninety degrees from the projection *b* will travel from the partition 1, and will when permitted engage in the notch *f*. When the springs 32 and 32' have passed out of the slot formed as heretofore described between the switch-adjusting members 19 and 25, said switch-adjusting members and switch-adjusting plates 18 and 24 will be returned by means of spring 22 to their normal position. The notch *f* now carrying the projection *d* of lever *c* with it, said lever *c*, rigidly secured to shaft 5, will, as heretofore set forth, throw the switch-

tongue 38. The projection *b* on the lever *c* will at this position drop from the top surface of the cam *a* because of the springing connection of the lever *c*, and when said switch-adjusting members and plates are again moved will travel on the under surface of cam *a*, which is inclined in a manner that will throw said projection *b* downwardly, and at the point of coincidence of notches *f* and *f'* will thus cause the projection *d* on the lever *c* to engage in the notch *f* on switch-adjusting plate 18 with it to said plates' normal position by the releasing of the switch-adjusting members 19, as heretofore described. The switch-tongue 28 is thrown by the pin 41, which is yieldingly carried by means of the springs 39 and 39', carried on the shaft 40, which is slidably mounted in lugs cast integral or rigidly secured to the switch-throwing plate 37.

The above-described yielding connection with the switch-tongue 38 is desirably constructed as shown in the accompanying drawings and is used to prevent the breaking of the more rigid members of my device, which might be done by the clogging of the switch-tongue 38 or by a car leaving a closed switch, which by this yielding connection may be accomplished without the opening of the switch by throwing the switch-tongue 38, except by the flange of the wheel in passing by it.

The springs 32 and 32', which are secured to the lower end of the vertically-disposed shifting-rod 29, are rigidly secured to the bar 31 at one end, which at its opposite end is provided with a slot 33 to permit the rivet or bolt 34, because of the compression of the springs 32 and 32', to travel longitudinally of its axis. Said bar 31 is forged integral or rigidly secured to the lower end of the vertically-disposed shifting-rod 29.

The switch-adjusting plates 18 and 24 are here shown as being slidably supported on the inner surface or the top partition of the casing 3 by means of guides, such as 20. I do not wish to be limited to this construction, as in some cases I may desire these switch-adjusting plates 18 and 24 slidably mounted on the upper surfaces of said top casing-partition. Neither do I wish to be limited to any of the exact detailed constructive features, but wish the privilege of such changes as are within the scope of my patent.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a switch-operating device of the nature indicated; the combination of a pivotally-mounted switch-tongue and switch-adjusting plates 19 and 25 and a switch-throwing plate 37 having a yieldingly-supported switch-throwing pin 41 and a rock-shaft substantially for the purpose described.

2. In a switch-operating device of the na-

ture indicated; the combination of a pivotally-mounted switch-tongue, switch-operating plates 19 and 25, a switch-throwing plate 37 having a yieldingly-supported switch-throwing pin 41 and a longitudinal shifting-cam adapted to operate the lever 12 as shown and for the purpose set forth.

3. In a switch-operating device of the nature indicated; the combination of a pivotally-mounted switch-tongue, switch-adjusting plates 19 and 25, a switch-throwing plate 37 having a yieldingly-supported switch-throwing pin 41 and a longitudinal shifting-cam adapted to operate the lever 12 and a combination of a vertically-disposed shifting-rod 29 yieldingly mounted throwing members as spring 32 and 32' for the purposes described.

4. In a street-car equipment a pedal 28, a vertically-disposed shifting-rod 29, yieldingly-supported switch-throwing springs 32 and 32', said yieldingly-supported switch-throwing springs 32 and 32' being each rigidly secured at the one end, each slidably secured to said bar 31 at the other end by means of a slot 33 and a pin 34, and means for mounting said vertically-disposed shifting-rod and all the attachments as shown connected thereto on the platform of a car for the purpose set forth.

5. In a street-railway equipment a combination of a railway-switch and separable switch-adjusting members 19 and 25, said members 19 and 25 being provided with notches *f* and *f'* adapted to alternately receive a lever 12 being adapted to operate a switch-tongue 38, and means for operating said members and railway-switch from the platform of a street-car by a yieldingly-mounted vertically-disposed shifting-rod 29 leaving openings 32 and 32' secured thereto by means of a bar 31 provided on its one end with a slot adapted to slidably secure the said springs 32 and 32' to the said bar 31, said bar 31 being rigidly secured to said springs 32 and 32' on its other end substantially as and for the purpose set forth.

6. In a switch-throwing device, the combination of the switch-tongue and switch-throwing plate 37, adapted to yieldingly throw said switch-tongue and rock-shaft provided with levers as 12 and 35, adapted to throw or operate on said switch-tongue-throwing plate 37, switch-adjusting plates as 18 and 24, and members 19 and 25, and means for incasing said switch-operating parts, which are below the surface of the pavement of road-bed from moisture, dirt and undesirable fragments, or obstacles substantially shown and for the purpose set forth.

7. In a switch-throwing device a flexible lever *c* having a projection *d* adapted to alternately travel on the upper and under surfaces of a cam *a*, said cam *a* being

adapted to cause a projection *b* on the said lever to alternately engage in notches *f* and *f'* for the purpose set forth.

5 8. In a switch-throwing device of the nature indicated; switch-adjusting members as 19 and 25, means for rigidly securing the switch-adjusting members to two or more switch-adjusting plates as 18 and 24, being adapted to operate a pivotally-mounted
10 switch-tongue by a spring-lever 12 being thrust alternately toward the said switch-adjusting plates 18 and 24, and into the notches *f* and *f'* by a cam, substantially as shown and for the purpose set forth.

15 9. In a switch-throwing device of the nature indicated; a slot formed having the sides of the said slot separable, and provided with a **V** or wedge shaped opening at either end of said slot thus formed and described, to facilitate the admission of a member or switch-
20 throwing rod having a greater width than the narrowest portion of said slot, substantially for the purpose set forth.

25 10. In a switch-throwing device of the nature indicated; the combination of switch-adjusting plates such as 18 and 24, having switch-adjusting members 19 and 25 being so disposed as to form a slot adapted to be widened by springs 32 and 32' cammed by a
30 car, said slot being substantially at ninety degrees from the direction of travel of the separable members forming the said slot, and a spring 22 adapted to yieldingly hold said

switch-adjusting plates and all parts attached thereto in a normal position, and
35 adapted to be operated and overcome by a switch-operating device carried by a car for the purpose set forth.

11. In a switch-throwing device of the nature indicated, the combination of switch-ad-
40 justing plates such as 18 and 24 having switch-adjusting members 19 and 25 being so disposed as to form a slot adapted to be widened by springs 32 and 32' cammed by a
45 car, said slot being substantially at ninety degrees from the direction of travel of the separable members forming the said slot, and a spring 22 adapted to yieldingly hold said
50 switch-adjusting plates and all parts attached thereto in a normal position, and adapted to yield and be overcome by a switch-throwing rod and bow-shaped springs, each having one end secured to a bar, and having the other end provided with a pin
55 adapted to travel in a slot provided in the said bar attached thereto as 32 and 32', substantially for the purposes set forth and a point-switch.

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

HARVEY DENNIS.

Witnesses:

KING DYKEMAN,
J. E. MOSES.