

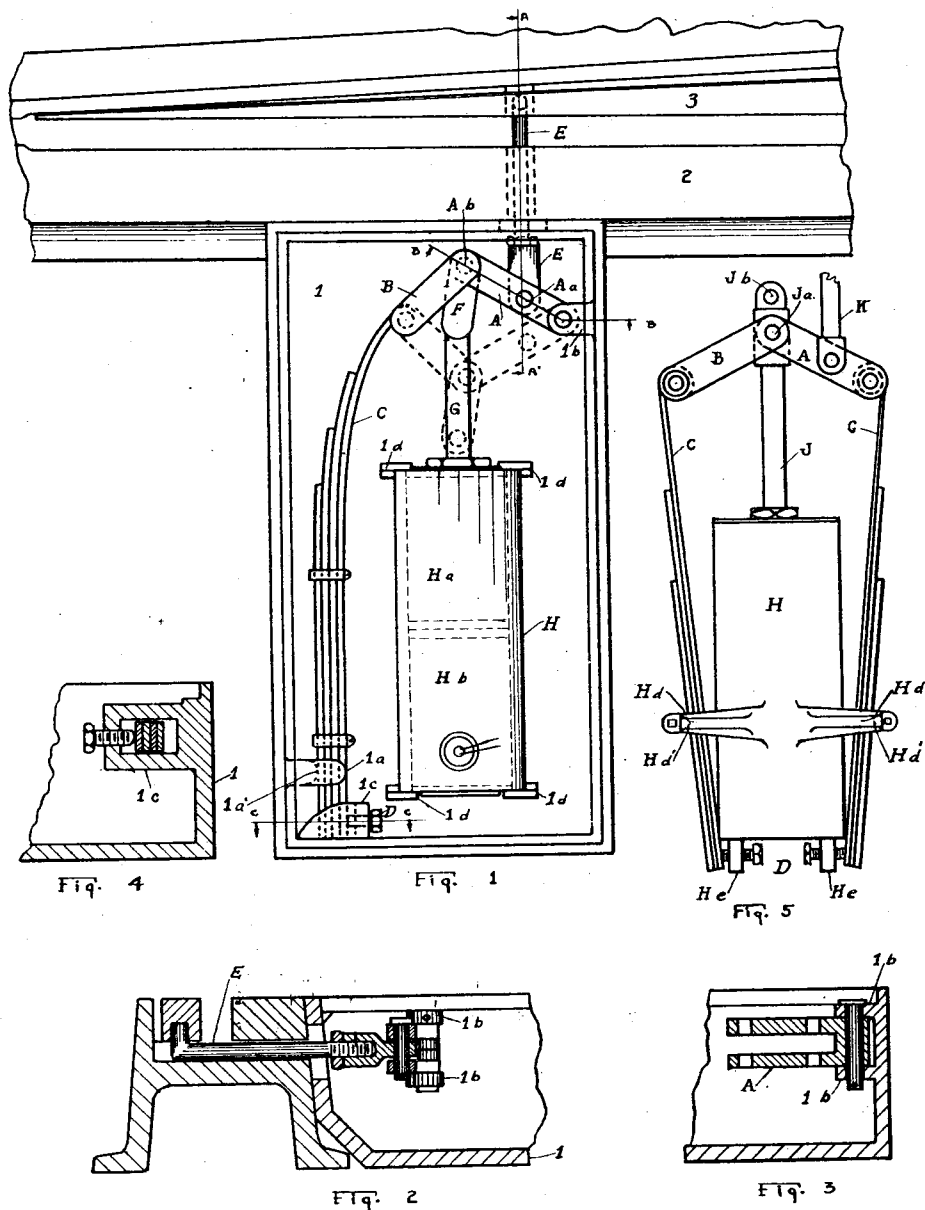
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J. L. MILTON

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SWITCH THROWING DEVICE

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INVENTOR.

John L. Milton

UNITED STATES PATENT OFFICE.

JOHN L. MILTON, OF LOUISVILLE, KENTUCKY, ASSIGNOR TO CHEATHAM ELECTRIC SWITCHING DEVICE COMPANY.

SWITCH-THROWING DEVICE.

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My invention relates to improvements in switch throwing devices in which the switch point of a railway track is thrown from one position to another and held by spring pressed parts; and the objects of my improvements are: first, to provide an effective holding device for the switch point with a view of minimizing "split switches"; second, to afford facilities for adjusting the tension on these parts to the maximum of the power that can be applied for operating the switch points; third, to provide means for the repeated servicing of parts.

I attain these objects by the mechanism illustrated in the accompanying drawing, in which—

Fig. 1 is a plan view of a preferred form of the mechanism as it appears after the removal of the lid; Fig. 2, is a vertical section of a part of the mechanism along the line A—A of Fig. 1; Fig. 3, is a vertical section of a part of the mechanism along the line B—B of Fig. 1; Fig. 4 is an enlarged section of the spring holding device along the line C—C of Fig. 1; Fig. 5 is a modified form of my invention wherein the device is assembled as a whole. The ground box or container 1, its projecting lugs 1^a, 1^b and 1^c in which is assembled the operating parts, is installed adjacent the track 2 which carries the switch point 3. From the lug or hinge member 1^b is pivoted lever A from which is pivoted lever B, this in turn is pivoted to leaf spring C, the latter being rigidly secured to the ground box through pressure exerted against it by screw D which is supported in yoke 1^c. This pressure forces the leaf spring against fulcrum 1^a, an integral part of projection 1^a. It will be seen that the tension of the leaf spring can be varied by means of adjusting screw D. To lever A, adjustable drag link E is also pivoted by pin Aa which completes the articulation.

Link F provides the pivot member Ab for effecting the articulation between levers A—B. This link is also pivoted to plunger G of the ground magnet housing H which is secured to the ground box 1 by lugs 1^d, 1^d.

Ground magnet housing H is constructed of magnetic material and contains two solenoid windings Ha, Hb with a cylindrical opening into which a magnetic plunger operates and so arranged and disposed that the application of current to solenoid Ha will operate the toggle mechanism composed of

levers A, B and spring C to the position shown in the drawing by full lines and when current is applied to the other section, Hb the toggle parts will take up the position shown by the dotted lines. From one position to the other the switch point 3 is carried by means of force applied through connecting link E. It is apparent that a relatively high force will be applied to the switch point which is the main object of the device.

An outstanding feature of this mechanism resides in the fact that by the use of a long and powerful leaf spring, a very heavy and highly elastic pressure is applied to the toggle joint which is in marked contrast to that developed by the conventional spiral springs which are of necessity quite short and heavy and of relatively low elasticity. Another desirable result gained by this arrangement is the reduced "dead center" when compared with the conventional type of spring. Attention is called to the relatively short length of lever B to lever A which assists in the holding force exerted by the spring.

In Fig. 5 I have shown plunger J of a straight rigid type with pivot Ja to which is articulated levers A and B which have their outer ends pivoted to leaf springs C, C which are in turn secured to the ground magnet housing H by means of arms Hd, Hd, which in turn carry fulcrum points Hd', Hd'. Ground magnet housing H also carries arms He, He, into which adjusting screws D are mounted for applying pressure similar to that employed in Fig. 1. I have arranged the connecting link K so that it can be articulated to lever A as shown in drawing or to eye Jb.

I am aware that prior to my invention switch throwing devices have been constructed with spring pressure toggle joints.

Therefore, I do not claim such a combination broadly; but, I claim:

1. A toggle joint provided with a pair of levers having one common articulation and independent bearings at their outer ends, one of said bearings being fulcrumed to the free end of a spring member which is substantially rigid at the other end.

2. A toggle joint provided with a pair of levers having one common articulation at their inner ends and independent bearings at their outer ends, one of said bearings being fulcrumed to the free end of a spring member which is substantially rigid at the other end.

3. A toggle joint provided with a pair of

levers having one common articulation and independent bearings at their outer ends one of said levers being spring pressed by a spring member which is substantially rigid at one
5 end and free at the other end.

4. A toggle joint provided with a pair of levers having one common articulation at their inner ends and independent bearings at their outer ends, one of said levers being
10 spring pressed by a spring member which is substantially rigid at one end and free at the other end.

5. A toggle joint provided with a pair of levers having bearings at their ends and one
15 common articulation, each of the other ends being fulcrumed to the free ends of spring members which are substantially rigid at their other ends.

6. A toggle joint provided with a pair of levers having bearings at their ends and one
20 common articulation at their inner ends, each of the other ends being fulcrumed to the free ends of spring members which are substantially rigid at their other ends.

7. The combination of a housing and a toggle joint provided with a pair of levers having one common articulation and independent
25 bearings at their outer ends, one of which is attached to the housing, the other one of said bearings being fulcrumed to the free end of a spring member which is substantially rigid
30 at the other end.

8. The combination of a housing and a toggle joint provided with a pair of levers having
35 one common articulation at their inner ends and independent bearings at their outer ends, one of which is attached to the housing, the other one of said bearings being fulcrumed to the free end of a spring member which is
40 substantially rigid at the other end.

9. The combination of a housing and a toggle joint provided with a pair of levers having one common articulation and independent
45 bearings at their outer ends, one of which is attached to the housing, the other one of said bearings being fulcrumed to the free end of a spring member which is held substantially rigid at the other end by the ground box.

10. The combination of a housing and a toggle joint provided with a pair of levers having one common articulation at their inner
50 ends and independent bearings at their outer ends, one of which is attached to the housing, the other one of said bearings being fulcrumed to the free end of a spring member which is held substantially rigid at the other end by the ground box.
55

11. The combination of a switch point and a toggle joint provided with a pair of levers
60 having one common articulation at their inner ends and independent bearings, one of said bearings being fulcrumed to the free end of a spring member which is substantially rigid at the other end.

65 12. The combination of a switch point and

a toggle joint provided with a pair of levers having one common articulation at their inner ends and independent bearings at their outer ends, one of said bearings being fulcrumed
70 to the free end of a spring member which is substantially rigid at the other end.

13. The combination of a switch point and a toggle joint provided with a pair of levers having a common articulation at their inner
75 ends and carried by an extension from said switch point and independent bearings at their outer ends, one of said bearings being fulcrumed to the free end of a spring member.

14. The combination of a housing and a toggle joint provided with a pair of levers
80 having one common articulation and independent bearings at their outer ends, one of which is attached to the ground box, the other one of said bearings being fulcrumed
85 to the free end of a spring member.

15. The combination of a housing and a toggle joint provided with a pair of levers having one common articulation at their inner
90 ends and independent bearings at their outer ends, one of which is attached to the ground box, the other one of said bearings being fulcrumed to the free end of a spring member.

16. The combination of a housing and a toggle joint provided with a pair of levers having one common articulation and independent
95 bearings at their outer ends, one of which is attached to the ground box, the other one of said bearings being fulcrumed to the free end of a spring member which is held substantially rigid at the other end by the housing.
100

17. The combination of a housing and a toggle joint provided with a pair of levers
105 having one common articulation at their inner ends and independent bearings at their outer ends, one of which is attached to the ground box, the other one of said bearings being fulcrumed to the free end of a spring member which is held substantially rigid at the other end of the housing.
110

18. The combination of an electrical switch throwing device and a toggle joint provided
115 with a pair of levers connected to the switch and having bearings at their ends and one common articulation at their inner ends, and independent bearings, one of which is attached to the ground box, the other one of said bearings being fulcrumed to the free
120 end of a spring member which is held substantially rigid at the other end by the ground box.

19. The combination of an electrical switch throwing device and a toggle joint provided
125 with a pair of levers connected to the switch and having bearings at their ends and one common articulation at their inner ends, and independent bearings at their outer ends, one of which is attached to the ground box,
130

the other one of said bearings being fulcrumed to the free end of a spring member which is held substantially rigid at the other end by the ground box.

5 20. The combination of an electrical switch throwing device including a solenoid with its armature and a toggle joint provided with a pair of levers, each connected to the switch and having bearings at their ends and one
10 common articulation carried by said armature.

21. The combination of an electrical switch throwing device including a solenoid with its armature and a toggle joint provided with
15 a pair of levers, each connected to the switch and having bearings at their ends and one common articulation carried by said armature, at their inner ends.

22. The combination of an electrical switch
20 throwing device and a toggle joint provided with a pair of levers connected to the switch and having bearings at their ends and one common articulation, each of the other ends being fulcrumed to the free ends of spring
25 members which are substantially rigid at their other ends.

23. The combination of an electrical switch throwing device and a toggle joint provided with a pair of levers connected to the switch
30 and having bearings at their ends and one common articulation at their inner ends, each of the other ends being fulcrumed to the free ends of the spring members which are substantially rigid at their other ends.

35 24. The combination of an electrical switch throwing device including a solenoid with its armature and a toggle joint provided with a pair of levers connected to the switch and having bearings at their ends and one com-
40 mon articulation carried by said armature, each of the other ends being fulcrumed to the free ends of spring members which are substantially rigid at their other ends.

25. The combination of an electrical switch
45 throwing device, including a solenoid with its armature and a toggle joint provided with a pair of levers connected to the switch and having bearings at their ends and one common articulation carried by said armature
50 at their inner ends, each of the other ends being fulcrumed to the free ends of spring members which are substantially rigid at their other ends.

26. The combination of a housing, switch
55 point and a toggle joint provided with a pair of levers having a common articulation at their inner ends and carried by an extension from said switch point and independent bearings, one of said bearings being ful-
60 crumed to the free end of a spring member which is held substantially rigid at the other end by the housing.

27. The combinatoin of a housing, switch
65 point and a toggle joint provided with a pair of levers having a common articulation at

their inner ends and carried by an extension from said switch point and independent bearings at their outer ends, one of said bearings being fulcrumed to the free end of a spring member which is held substantially rigid at
70 the other end by the housing.

28. The combination of a magnet comprising a solenoid, housing and plunger and a toggle joint provided with a pair of levers having a common articulation and independ-
75 ent bearings at their outer ends which are fulcrumed to the free ends of spring members which are held at the other end by said magnet.

29. The combination of a magnet compris-
80 ing a solenoid, frame and armature and a toggle joint provided with a pair of levers having a common articulation with said plunger and independent bearings at their outer ends which are fulcrumed to the free
85 ends of spring members which are held at the other end by said magnet.

30. The combination of a magnet comprising a solenoid, housing and plunger and a toggle joint provided with a pair of levers
90 having a common articulation and independent bearings at their outer ends which are fulcrumed to the free ends of spring members which are held substantially rigid at the other end by said magnet.
95

31. The combination of a magnet comprising a solenoid, housing and plunger and a toggle joint provided with a pair of levers having a common articulation with said
100 plunger and independent bearings at their outer ends which are fulcrumed to the free ends of spring members which are held substantially rigid at the other end by said magnet.

32. The combination with an electromag-
105 net having a magnetic housing and an armature and a spring controlled toggle joint mounted on said housing, said toggle joint being connected to said armature and operable by said electromagnet.
110

33. The combination with an electromag-
net having a magnetic housing, disposed in the path to the magnetism of said electro-
magnet and an armature and a spring controlled toggle joint mounted on said housing,
115 said toggle joint being operable by said electromagnet.

34. The combination with an electromag-
net having a magnetic housing and an arma-
ture and a spring controlled toggle joint
120 mounted on said housing, said toggle joint being connected to said armature.

35. The combination with an electromag-
net having a magnetic housing, disposed in the path to the magnetism of said electromag-
125 net and an armature and a spring controlled toggle joint mounted on said housing.

In testimony whereof I affix my signature.

JOHN L. MILTON.