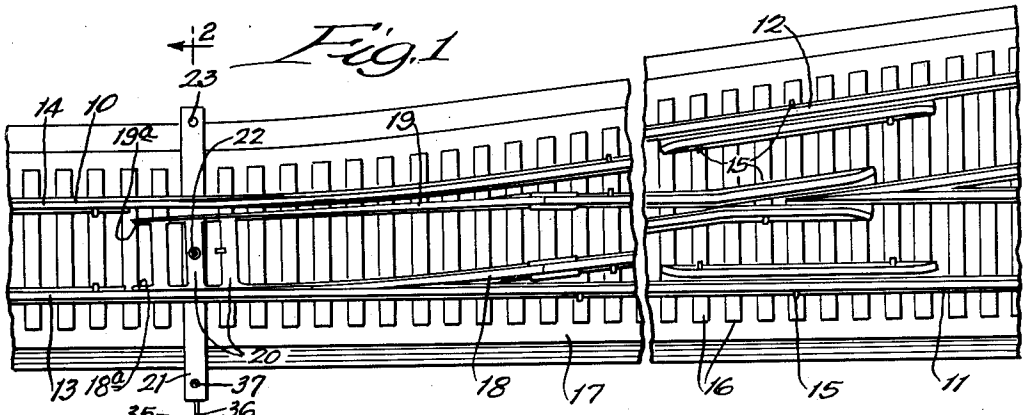
June 21, 1949. H. B. PEABODY 2,473,661

DOUBLE-ACTING SOLENOID FOR CONTROL OF MODEL RAILROAD SWITCHES

Filed March 23, 1948

Fig. 1



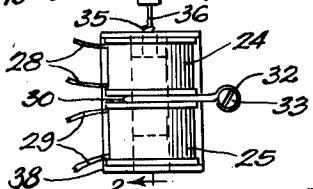


Fig. 2

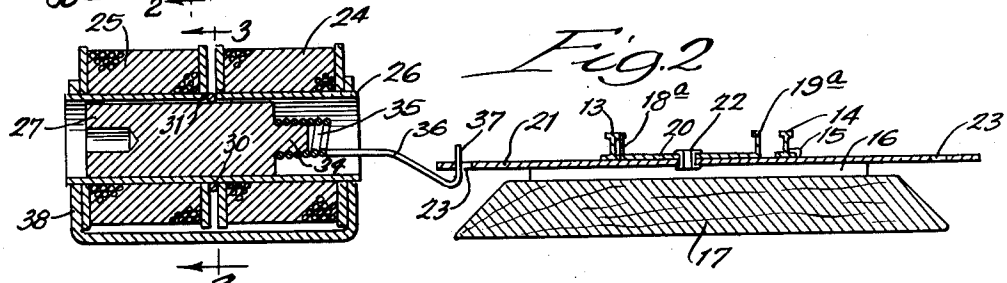


Fig. 3

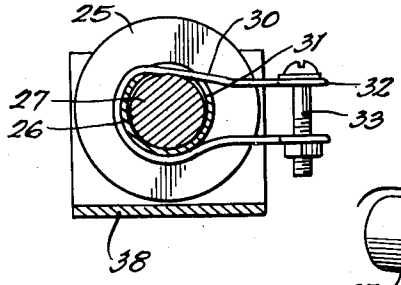


Fig. 4

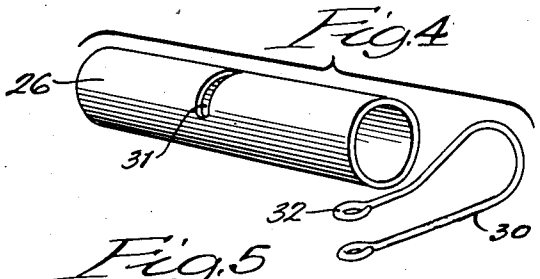
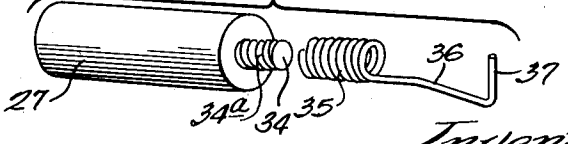


Fig. 5



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DOUBLE-ACTING SOLENOID FOR CONTROL OF MODEL RAILROAD SWITCHES

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4 Claims. (Cl. 175—337)

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This invention relates to a switching device for railroads and particularly to an electro-responsive switching mechanism for regulating the position of switch tracks of a model railroad.

In the operation of model railroads, a certain degree of delicacy and care must be exercised, otherwise the relatively light and insecured parts will be put out of adjustment. This precautionary measure pertains especially to the chain of tracks and to the switch tracks on which the trains operate. When the operator is fortunate enough to detect a track section or switch track which is out of adjustment, it is necessary to stop the operations of the train until the break can be repaired or the tracks realigned. In the event that the misalignment is not immediately detected and readjusted, the train may be thrown from the track, in which instance, the tracks, the train, or nearby objects might be injured or damaged beyond repair. These same considerations pertain to the operation of larger model trains or even to full-scale passenger or freight trains operating over standard gauge tracks.

To employ elements which deliberately subject the tracks and switch parts to disturbing reactions and impact, unduly complicates the operation of the train and creates an ever-present hazard. Thus, switching operations comprise an ever-present problem because during switching the tracks are subjected to sidewise thrusts which might disturb track alignment. For example, an element heretofore employed for automatically effecting switch operations comprises an electro-responsive solenoid having a shiftable core member connected for adjusting the switch tracks. When the solenoid system operates on direct current, the core is caused to slam into the desired position of adjustment and obviously disturbs the alignment of the tracks. When the solenoid system operates on alternating current, a pronounced chattering effect is observed during the movement of the core. In either instance, the operated parts, that is the switch tracks and the associated track sections, are shifted in anything but a delicate manner and require readjustment and repair, and damage often results.

It is an object of this invention to provide a switch device for railroads which is smooth in operation and which effects the desired track adjustment in an efficient manner.

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Another object is to provide a switch device operated by electro-responsive means mounted alongside of the tracks of the railroad and connected to the switch tracks through a coupling which allows a certain amount of play in the connected parts.

A further object is to provide a railroad track switching mechanism having an electro-responsive actuator which is adapted to effect the desired track displacement in a smooth manner and at a uniform rate whether it is energized by direct or alternating current.

These and other objects and advantages of the invention will be more readily apparent from the following description when read in connection with the accompanying drawing, in which—

Figure 1 is a top plan view of a section of railroad track embodying the switch mechanism of this invention;

Figure 2 is an enlarged sectional view taken substantially along the line 2—2 of Fig. 1;

Figure 3 is a sectional view taken along the line 3—3 of Fig. 2;

Figure 4 is a perspective view of the sleeve on which the solenoids are wound and of the clamp member to be used with the sleeve; and

Figure 5 is a perspective view of the core and its flexible coupling part.

As shown in the drawing, a switch section of tracks is used for directing the movement of the train from a main track 10 to one or more of the other separating tracks 11 and 12. The tracks comprise spaced rails 13 and 14 fixed, as by spikes 15, to the tie rods 16 carried on a road bed 17. The switching tracks comprise the usual pair of spaced rails 18 and 19 connected at one end by ties 20 and coupled at the other end to the corresponding inner rails of the separating tracks 11 and 12. The spaced relation between the switch tracks 18 and 19 is slightly less than that of the main tracks 13 and 14 between which they are disposed so that as the tapered end portions 18a and 19a are shifted laterally in one direction or the other, one or the other of the tapered rails is brought into engagement with the adjacent main rail, while a spaced relation exists between the other rails. Thus, the wheels of the oncoming train are guided onto one or the other of the separated track sections.

The switch tracks may be manually shifted to

effect switching movements, but, normally, shifting is effected by means of a cross-arm 21 disposed beneath the tie rod 20 and extending laterally beyond the road bed 17. A rigid connection may be established between the cross arm 21 and the tie rod 20 connecting the rails, but I have found that greater flexibility is secured when the cross arm 21 is swiveled to the tie rod 20, as by the pivotal riveted connection 22. Openings 23 are provided at opposite ends of the cross arm 21 for connection with suitable switch operating means.

My improved switch operating means comprises a pair of solenoids 24 and 25 arranged in side by side spaced relation on an elongate sleeve 26. Transversely shiftable between two positions of adjustment within the sleeve is a core 27 of cylindrical shape or other symmetrical contour corresponding to the contour of the sleeve 26 to enable axial sliding movement. The solenoids are separately energized through leads 28 and 29, and when so energized, the core is caused to shift to one or the other of its positions of adjustment.

As previously pointed out, movement of the core tends to be very rapid when direct current is used to energize the solenoid, and it tends to chatter during the movement when alternating current is used. In order to eliminate such undesirable tendencies, I have provided a member which frictionally engages the core whereby its movement from one position to the other may be adjusted to the desired speed and is rendered in a smooth and uniform manner. In other words, the alternating high speeds and low speeds heretofore obtained by alternating current operation are neutralized to provide smooth and substantially uniform movement. Similarly, the impulsive speed of the core is thereby greatly reduced when direct current is used. For securing these beneficial operational results, there is provided a clamp member which is shown in the form of an elongate U-shaped strip 30 which fits about the sleeve in the region between the solenoids 24 and 25. A portion of the strip 30, which may be out of round as indicated in Fig. 3, extends through a slot 31 in the sleeve to engage the side wall of the contained core 27. To adjust the degree of frictional force by which the clamp member engages the core, the free ends of the clamp, ordinarily in spaced relation, are provided with loops 32 which receive connecting screw and nut means 33 to adjust their spaced relation. It will be evident that by seating in the slot 31, the clamping member will be held stationary. A housing 38 through which the sleeve extends may be provided for the solenoids, by which means the switch mechanism may be anchored, if desired, to the floor.

As the screw 33 is tightened, the clamp 30 is flexed and thereby grips core 27 more tightly. This flexure causes the clamp 30 to act as a resilient clamping member or a spring means.

Another feature of this invention resides in the coupling which provides an operative connection between the cross-arm 21 and the core 27. The coupling is a flexible coupling and transmits the movement of the core to the tie rod 21 even though the two elements may be disposed in angular relation one with the other. As illustrated in Figs. 2 and 5, a reduced end portion 34 of the core 27 is provided with screw threads 34a threadably to receive a coiled end portion 35 of a resilient wire 36 having a hook 37 on the other end insertable through one of the openings 23 on the end of the cross-arm 21. It will be evident that the coiled portion 35 and the wire itself impart flexibility to the connection while the hook merely pivotally engages the arm.

From the description, it will be apparent that I have produced a new and improved switch operating mechanism for railroad tracks employing electro-responsive means for shifting the switch tracks in such manner that sudden movements or impacts heretofore secured from such solenoid operations are effectively eliminated. Thus, the switch mechanism may be operated from direct or alternating current without the fear of upsetting track alignment or complicating switching operations. By the use of a flexible coupling between the actuating mechanism and the tracks themselves, it is possible to situate the actuating mechanism angularly with respect to the tracks or to effect the desired switching operations notwithstanding the fact that the cross-arm or switch mechanism may not be exactly in transverse alignment.

The essentials of the structure can also be used in other devices, such as a magnetic circuit breaker, and similar devices where a solenoid is used and it is desired to brake the movement of the solenoid armature and prevent chatter and bounce.

It will be understood that numerous changes in the details of construction, arrangement, and operation may be effected without departing from the spirit of my invention, especially as defined in the following claims.

I claim as my invention:

1. A mechanism for actuating a railroad switch, comprising a sleeve having an aperture extending partially about its periphery, a pair of solenoids surrounding said sleeve, one on each side of said aperture, a magnetic core of smooth surface configuration in said sleeve and axially shiftable in response to energization of one or the other of said solenoids, a U-shaped braking member extending about said sleeve and through said aperture into engagement with said core, and means operable to pinch together the free ends of said braking member.

2. A mechanism for actuating a railroad switch comprising a sleeve having an aperture extending partially about its periphery, a solenoid surrounding said sleeve, a magnetic core of smooth surface configuration in said sleeve and axially shiftable in response to energization of said solenoid, a U-shaped braking member extending through said aperture into engagement with said core, and means operable to pinch together the free ends of said braking member.

3. A mechanism for actuating a railroad switch, comprising a sleeve having an aperture extending partially about its periphery, a pair of solenoids surrounding said sleeve, one on each side of said aperture, a magnetic core of smooth surface configuration in said sleeve and axially shiftable in response to energization of one or the other of said solenoids, a U-shaped braking member extending about said sleeve and through said aperture into engagement with said core, and means adjustably operable to pinch together the free ends of said braking member to adjust the degree of frictional pressure of the braking member against the core.

4. A mechanism for actuating a railroad switch comprising a sleeve having an aperture exteding partially about its periphery, a solenoid surrounding said sleeve, a magnetic core of smooth surface configuration in said sleeve and axially shiftable in response to energization

of said solenoid, a U-shaped braking member extending through said aperture into engagement with said core, and adjustable means operable to pinch together the free ends of said braking member to adjust the degree of frictional pressure of the braking member against the core.

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