L. L. LADD.

SWITCHING OR SELECTING MECHANISM.

APPLICATION FILED DEC. 13, 1920.

1,391,195. **Patented Sept. 20, 1921.**

2 SHEETS—SHEET 1.

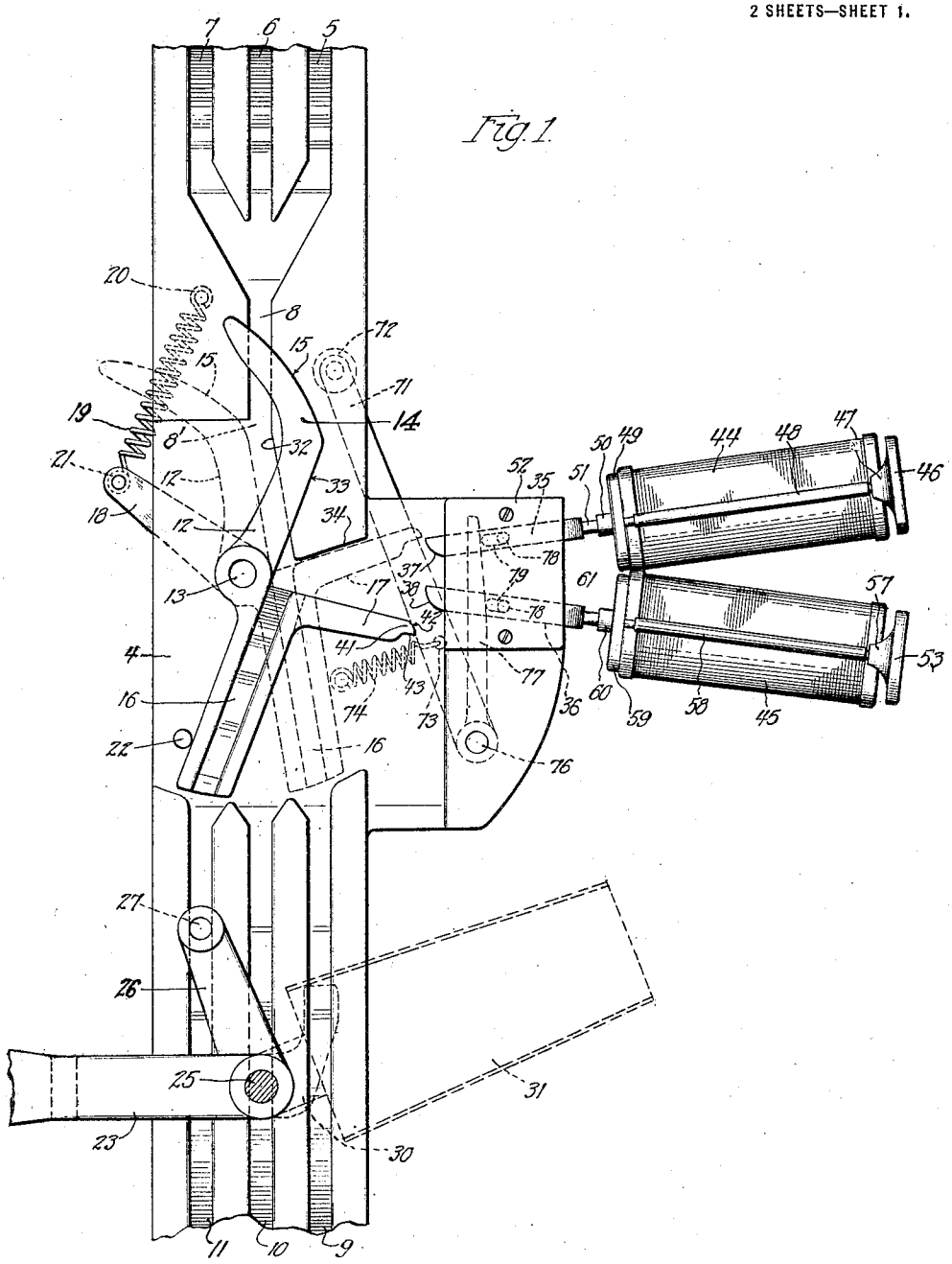


Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

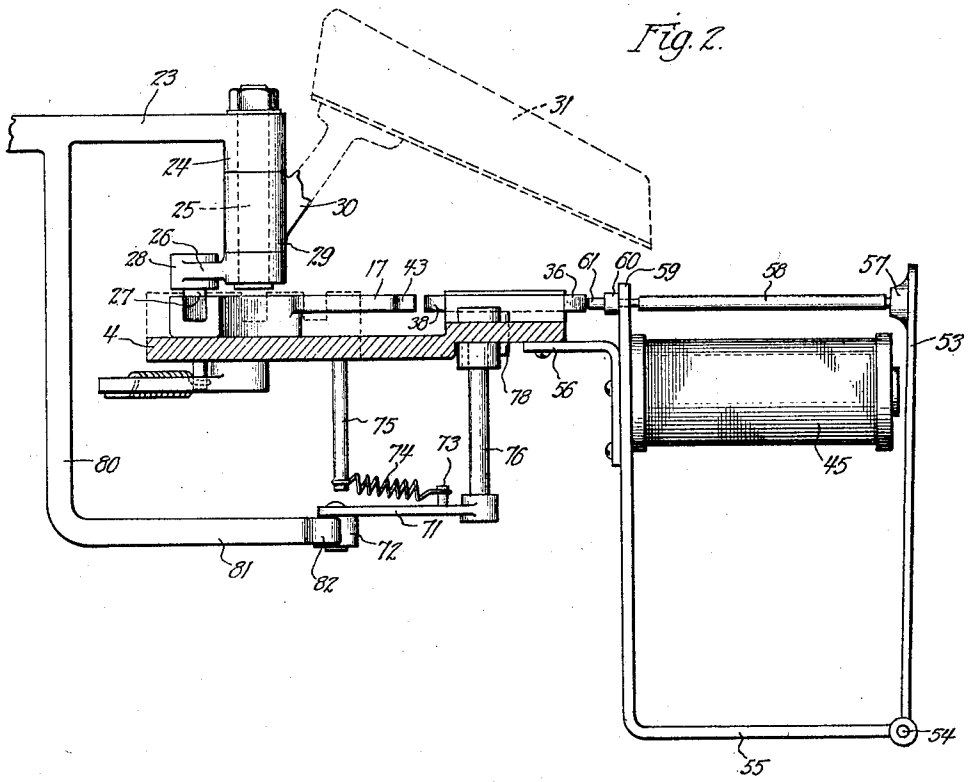
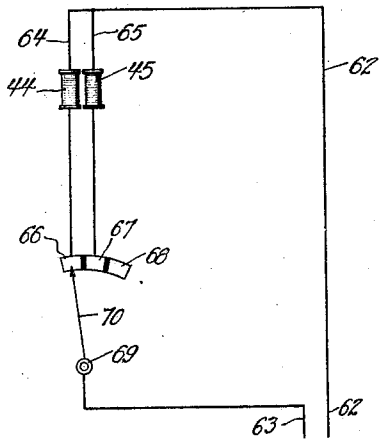


Fig. 3.



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UNITED STATES PATENT OFFICE.

LESTER L. LADD, OF CHICAGO, ILLINOIS, ASSIGNOR TO PHOTOMETRIC PRODUCTS CORPORATION, OF CHICAGO, ILLINOIS.

SWITCHING OR SELECTING MECHANISM.

1,391,195. Specification of Letters Patent. Patented Sept. 20, 1921.

Application filed December 13, 1920. Serial No. 430,268.

To all whom it may concern:

Be it known that I, LESTER L. LADD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Switching or Selecting Mechanism, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to switching or selecting mechanism, and more particularly to a mechanism whereby a switch is adapted to assume a plurality of positions to direct a member traveling along a track onto anyone of a plurality of tracks.

It is a purpose of the invention to provide a switch mechanism that is engaged by the member traveling in the track to always move the same into one of a plurality of positions, and that is provided with means tending to move the same in an opposite direction and with selectively controlled stops for holding said switch in a plurality of different positions.

It is a further purpose of the invention to provide a switch mechanism of the character described above, wherein the stops are controlled by a suitable mechanism, comprising a plurality of electromagnets and means for actuating the same comprising a switch mechanism having a plurality of contacts, the position of the movable member of said switch being either manually or automatically controlled.

It is also an object of the invention to provide means for retracting the stops to inoperative position, said means positively returning said stops to inoperative position prior to the time when the member operating in said track engages said switch.

It is still a further object of the invention to provide a plurality of parallel tracks with a switch mechanism having a pivoted switch member provided with a cam face adapted to be engaged by a member moving along one of said tracks to move said switch to one of its switching positions.

It is another object of the invention to provide suitable stop pins for holding said switch in a plurality of positions, one of which is adapted to hold said switch in the position to which it is moved by means of said cam, said stop pins being projected into the path of said switch by electromagnetic means associated therewith.

It is moreover an object of the invention to provide a switch that is moved in one direction against the tension of a spring and to provide stops that may be projected into the path of said switch to halt the return movement of said switch at certain predetermined points.

Other objects and advantages of the invention will appear as the description of the accompanying drawings proceeds. However, I desire to have it distinctly understood that I do not intend to limit myself to the exact details shown in the drawings and described in the specification, but that I intend to include as part of my invention all such obvious changes and modifications of parts as would occur to a person skilled in this art or as would fall within the scope of the claims. In the drawings:

Figure 1 is a plan view showing my improved switching device and a portion of the track with which it coöperates;

Fig. 2 is a transverse section of the track, showing an end view of the switch mechanism; and

Fig. 3 is a diagram of the electrical connections used to operate the switch.

The improved switch mechanism is shown in the drawings as being applied to a base member 4 which is provided with the tracks 5, 6 and 7 which converge into a common track 8 and which base member is provided with the tracks 9, 10 and 11, which may or may not be continuations of the tracks 5, 6 and 7 as desired. The tracks are shown as being straight in Fig. 1, but may follow a circular or any other path as far as the switch mechanism is concerned. The switch mechanism comprises a switch member 12 pivoted to the base 4 at 13 and having an extension 14 provided with a cam face 15. The switch 12 is provided with a forwardly extending track portion 16 and with a right angularly extending arm 17 at one side of the pivot point 13 and with an arm 18 extending in a direction opposite to the arm 17. Connected to the end of the arm 18 and to the base member 4 in any suitable manner is the coil spring 19, the same being shown as being hooked around a pin 20 on the base member 4 and coiled around a pin 21 on the arm 18. It will be seen that the spring 19

will tend to turn the switch in a clockwise direction as the same is shown in Fig. 1, and that this movement will be limited by the stop 22 on the base member 4. The switch may be operated to direct any member into its proper track that moves along the track 8 toward the switch, and in the drawings a member is shown that is supported in any suitable manner to the left of the track which is provided with an arm 23 having a downwardly extending boss 24 in which is mounted a pivot pin 25, and mounted to turn on the pivot pin 25 is the arm 26 provided on the end with a downwardly extending projection or roller 27, which is adapted to travel in anyone of the tracks. The arm 26 is provided with an enlargement or boss 28 at the end thereof, and mounted on the pin 25 and adapted to turn with the arm 26 is the member 29 provided with the arm or support 30 for the chute or carrier 31. It will be seen that as the member carrying the arm 23 travels parallel to the track, the member 31 will be adapted to assume a plurality of angular positions relative to the arm 23 depending upon which track the projection 27 is operating along. While the particular device shown as being used in coöperation with the switch mechanism comprises a member that is adapted to assume these angular positions, yet it will be clear that the switch can be used for any member operating in the track 8 from what follows.

The enlargement or boss 28 or a similar enlargement or curved faced member on any member operating in the track 8 is adapted to engage the cam face 15 on the switch 12, and as the same is moved along the track this member will move the switch from the full line position in Fig. 1 to the dotted line position in said figure. When in this dotted line position it will be seen that the beveled shoulder 32 on the base member 4 and the straight face 33 on the switch will provide an extension 8′ of the track 8 along which the member carrying the cam engaging the part 28 is adapted to move. It will also be seen that when the switch is in the dotted position referred to the arm 17 will engage the shoulder 34 to limit the movement thereof, and that the track portion 16 will be in such position as to direct the member traveling along the track into the track 9 located to the extreme right in Fig. 1.

It will be noted that the track 16 provided on the switch 12 commences slightly toward the cam end of the switch from the line that could be drawn through the pivot point 13 and the lug 21, and it will be clear that when the member 28 has entered the track 16 that the spring 19 will tend to move the switch to the full line position shown in Fig. 1, and that unless some means were provided to halt this movement at selected points that the switch would always return to the full line position, and the member traveling along the track would enter the track 11. In order to provide suitable means for guiding the member into the tracks 9 and 10 stop pins 35 and 36 are provided, the pins being provided with end portions having curved faces 37 and 38 and straight faces 39 and 40. The arm 17 of the switch is provided with a projection or finger 41 having a correspondingly curved face 42 and a straight face 43. It will be seen that if the stop pin 35 is projected toward the left in Fig. 1 that the same will hold the switch in the position shown in dotted lines in Fig. 1 due to the interengagement of the straight portions 43 and 39 on the finger and stop pin respectively, while if the pin 36 were projected the switch will be held in such position that the member traveling along the track 16 will enter the track 10, it being understood that the pins 35 and 36 must be projected when the switch member is moved into the dotted line position. Any suitable means may be provided for projecting the stop pins 35 and 36 selectively, it being, of course, obvious that only one stop pin be projected at a time and that the projection of the stop pins will not prevent the movement of the switch member in a counter-clockwise direction as the rounded portion 42 will ride over the rounded portions 37 and 38. The means for projecting the stop pins comprises the electromagnets 44 and 45. Coöperating with the electromagnet 44 is the armature 46 provided with a boss 47 carrying a plunger 48 which is guided through a bracket 47 and is provided with a sleeve 50 to limit its movement toward the right in Fig. 1, and having an end portion 51 that is adapted to engage the end of the stop pin 35, which stop pin is slidably mounted in a guideway in the plate 52, the pin 36 being mounted in a similar guideway in the same plate. In a similar manner the electromagnet 45 has coöperating therewith the armature 53, both of the armatures 46 and 53 being suitably pivoted on a bracket, the armature 53 being shown as being pivoted at 54 on the bracket 55 secured to the base member 4 at 56. The armature 53 is provided with a boss 57 having mounted therein the plunger 58 which is guided through the member 59 and is provided with a sleeve 60 which is adapted to limit the movement of the plunger toward the right and having an end portion 61 that is adapted to engage with the end portion of the pin 36 to project the same toward the left in Fig. 1. It will be seen that when the solenoid 44 is energized that the armature 46 will be drawn toward the same and the plunger 48 will move the stop pin 35 into the path of movement of the arm 17. In a similar manner if the solenoid 45 is operated the armature 53 will be drawn to-

ward the same and will move the plunger 58 to the left, thus projecting the stop pin 36 into the path of movement of the arm 17.

Referring now to Fig. 3 a diagram of the electrical devices for operating the stop pins is shown, which comprises the line wires 62 and 63, the wire 62 having the branches 64 and 65 in which are provided respectively the electromagnets 44 and 45, and which are connected with the contacts 66 and 67. The wire 63 has connected thereto at 69 the movable contact member 70 which is adapted to coöperate with any one of the contacts 66, 67 or 68, the contact 68 being dead, that is having no connection with the wire 62. The member 70 may be a hand operated movable contact member pivoted at 69 or may be an indicator that indicates some measurement or characteristic of an article associated with the member moving along the track, such as is shown in my copending application 419,848, filed Oct. 27, 1920. It will be seen that if the movable contact member 70 is in engagement with the contact 68 that none of the electromagnets will be energized, while if it is in contact with the member 67 the electromagnet 45 will be energized, while if in contact with the member 66 the electromagnet 44 will be energized. It will be seen that if the switch is in the position shown in Fig. 3 that the solenoid 44 will be energized to project the stop pin 35 into the path of movement of the arm 17 so as to hold the switch 12 in the dotted line position shown in Fig. 1, after the same has been moved to that position due to the engagement of the member 28 with the cam face 15 and that the member traveling along the track will be directed into the track 9. In a similar manner if the contact member 70 were coöperating with the contact 67 the electromagnet 45 would be energized to project the stop pin 36 into the path of movement of the arm 17 so that the switch will be in position to direct the member traveling therealong into the track 10, while if the movable contact member 70 were in engagement with the contact 68 no pin would be projected and the spring 19 would move the switch to the full line position shown in Fig. 1 when the member traveling along the track 16 will be directed into the track 11. It will be clear from the above that it is not necessary that the number of stop pins and tracks used be the same as shown in Fig. 1, but that any number could be used depending upon the number of different paths that it is desired to have the member travel along. All that is necessary is that the number of tracks provided and the number of solenoids, contacts and stop pins be such that the tracks exceed the number of solenoids by one and that the same number of contacts be provided as there are tracks.

After the circuit is broken in which the electromagnet is interposed, the armature and parts associated therewith are moved to the position shown in Figs. 1 and 2. However, the stop pin that has been projected will remain in the projected position until it is returned by some means. Suitable means are provided for retracting the stop pins, these means comprising the arm 71 provided with the roller 72 and carrying the pin 73 to which is attached the coil spring 74 having its opposite end secured to the pin 75 mounted on the base member 4. The arm 71 is keyed to the vertical shaft 76 to which is keyed the arm 77 which is adapted to engage the pins 78 operating in the slots 79 in the base member 4, which pins 78 are fixed to the stop pins 35 and 36 in any suitable manner. Mounted on the arm 23 is a downwardly extending bracket 80 having a horizontally extending portion 81 carrying the cam 82 which is adapted to engage with the roller 72 on the arm 71. It will be seen that the arm 71 is normally held in such position that the arm 77 will be out of engagement with the pins 78 due to the action of the spring 74. However, when the cam 82 on the member that is moving parallel to the track engages with the roller 72 the arm 71 is moved clockwise, and with it the arm 77 is moved clockwise to engage with one of the pins 78 to move the stop pin 35 associated therewith to the position shown in Fig. 1 and after the cam 82 passes the roller 72 the parts will again move to a position such that the arm 77 will be free of the pins 78 in any position of the stop pins 35 or 36 so that the same will not interfere with the operation of these pins by the energization of the electromagnets associated therewith.

Having thus described my invention what I desire to claim and secure by U. S. Letters Patent is:

1. A device of the character described comprising a plurality of substantially parallel horizontally extending tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along a common track into any one of said tracks and means for controlling the position of said switch member.

2. A device of the character described comprising a plurality of tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member, said means comprising means on said switch member with which said traveling member is adapted to engage to move said switch member to one extreme position thereof, means urging said switch member away from said extreme position, and a plu-

rality of movable stop members with which said switch member is adapted to engage.

3. A device of the character described comprising a plurality of tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member, said means comprising a plurality of stops with which said switch member is adapted to engage and means for moving said stops into the path of said switch member.

4. A device of the character described comprising a plurality of tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member, said means comprising a plurality of stops with which said switch member is adapted to engage and means for moving said stops into the path of said switch member comprising an electromagnet associated with each of said stops and selective means for energizing said magnets.

5. A device of the character described comprising a plurality of tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member comprising a pair of fixed stops, means on said switch member with which said traveling member is adapted to engage to move said switch member into engagement with one of said stops, and means urging said switch member toward the other of said stops.

6. A device of the character described comprising a plurality of tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member comprising a pair of fixed stops, means on said switch member with which said traveling member is adapted to engage to move said switch member into engagement with one of said stops, and means urging said switch member toward the other of said stops, said switch member being in its normal position of rest when in engagement with said last mentioned stop.

7. A device of the character described comprising a plurality of tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member comprising a pair of fixed abutments, means on said switch member with which said traveling member is adapted to engage to move said switch member into engagement with one of said abutments, means urging said switch member toward the other of said abutments, and a plurality of stops between said abutments adapted to be selectively actuated to halt the movement of said switch member toward said last mentioned abutment.

8. A device of the character described comprising a plurality of tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member comprising means on said switch member with which said traveling member is adapted to engage to move said switch member in one direction, means tending to move said switch in the opposite direction, a plurality of stops in the path of movement of said switch, and means for selectively actuating said stops.

9. A device of the character described comprising a plurality of tracks, a pivoted switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along a common track into any one of said tracks, and means for controlling the position of said switch member, said means comprising an extension on said switch member projecting across said common track with which said traveling member is adapted to engage to move said switch member to one extreme position.

10. A device of the character described comprising a plurality of tracks, a pivoted switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member, said means comprising a plurality of stops with which said switch member is adapted to engage and means for moving said stops into the path of said switch member.

11. A device of the character described comprising a plurality of tracks, a pivoted switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member, said means comprising a plurality of stops with which said switch member is adapted to engage and means for moving said stops into the path of said switch member comprising an electromagnet associated with each of said stops and selective means for energizing said magnets.

12. A device of the character described

comprising a plurality of tracks, a pivoted switch member adapted to oscillate between two extreme positions and to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member comprising means on said switch member with which said traveling member is adapted to engage to move said switch member to one extreme position.

13. A device of the character described comprising a plurality of tracks, a pivoted switch member adapted to oscillate between two extreme positions and to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member comprising means on said switch member extending across one of said tracks which said traveling member is adapted to engage to move said switch member to one extreme position, means tending to move said switch in the opposite direction, and a plurality of stops in the path of movement of said switch to halt the movement of said switch at a selected position.

14. A device of the character described comprising a plurality of tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member comprising means on said switch member with which said traveling member is adapted to engage to move said switch member in one direction, means tending to move said switch in the opposite direction, and a plurality of selectively projected stops in the path of movement of said switch.

15. A device of the character described comprising a plurality of tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member, said means comprising a plurality of selectively controlled stops with which said switch member is adapted to engage.

16. A device of the character described comprising a plurality of tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member comprising means on said switch member with which said traveling member is adapted to engage to move said switch member in one direction, means tending to move said switch in the opposite direction, a plurality of stops in the path of movement of said switch, and means for selectively actuating said stops, said means comprising an electro-magnet associated with each of said stops.

17. A device of the character described comprising a plurality of tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member comprising means on said switch member with which said traveling member is adapted to engage to move said switch member in one direction, means tending to move said switch in the opposite direction, a plurality of stops in the path of movement of said switch, and means for selectively actuating said stops, said means comprising an electromagnet associated with each of said stops and selective means for energizing said magnets.

18. A device of the character described comprising a plurality of tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member comprising means on said switch member extending across one of said tracks for automatically moving said switch member in one direction.

19. A device of the character described comprising a plurality of tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member comprising means on said switch member extending across one of said tracks for automatically moving said switch member in one direction, and means tending to move said switch in the opposite direction.

20. A device of the character described comprising a plurality of tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member comprising means for automatically moving said switch member in one direction, means tending to move said switch in the opposite direction, and a plurality of stops adapted to be selectively projected into the path of movement of said switch.

21. A device of the character described comprising a plurality of tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks

into any one of said tracks and means for controlling the position of said switch member comprising means for automatically moving said switch member in one direction, means tending to move said switch in the opposite direction, a plurality of stops adapted to be selectively projected into the path of movement of said switch, and means for automatically retracting said stops.

22. A device of the character described comprising a plurality of tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member comprising a cam on said switch member with which said traveling member is adapted to engage to move said switch member in one direction.

23. A device of the character described comprising a plurality of tracks, a switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along one of said tracks into any one of said tracks and means for controlling the position of said switch member comprising means for automatically moving said switch member in one directions, means tending to move said switch in the opposite directions, a plurality of stops adapted to be selectively projected into the path of movement of said switch, and a cam for automatically retracting said stops.

24. In a device of the character described, a switch, a spring tending to hold said switch in one position, means for moving said switch against the tension of said spring and stops adapted to be projected into the path of movement of said switch to halt the return movement of said switch due to the action of said spring at a selected position.

25. A device of the character described comprising a plurality of tracks, a pivoted switch member adapted to assume a plurality of positions relative to said tracks to direct a member traveling along a common track into any one of said tracks, and means for controlling the position of said switch member, said means comprising a cam member on said switch member projecting across said common track with which said traveling member is adapted to engage to move said switch member in one direction.

26. A device of the character described comprising a plurality of tracks, a pivoted switch member adapted to assume a plurality of positions relatively to said tracks, said switch member having a rearward cam extension and a lateral extension, and a plurality of stops with which said lateral extension is adapted to coöperate.

27. A device of the character described comprising a plurality of tracks, a pivoted switch member adapted to assume a plurality of positions relatively to said tracks, said switch member having a rearwardly extending cam member normally projecting across one of said tracks and a lateral extension, and a plurality of stops with which said lateral extension is adapted to coöperate.

28. A device of the character described comprising a plurality of tracks, a pivoted switch member adapted to assume a plurality of positions relatively to said tracks, said switch member having a rearwardly extending cam member normally projecting across one of said tracks and a laterally extending finger, and a plurality of stops which said finger is adapted to engage.

29. A device of the character described comprising a plurality of tracks, a pivoted switch member adapted to assume a plurality of positions relatively to said tracks, said switch member having a rearwardly extending cam member normally projecting across one of said tracks, a laterally extending finger, and a plurality of stops which said finger is adapted to engage, and means for selectively projecting said stops into the path of movement of said switch.

30. A device of the character described comprising a plurality of tracks, a pivoted switch member adapted to assume a plurality of positions relatively to said tracks, said switch member having a rearwardly extending cam member normally projecting across one of said tracks, a laterally extending finger, and a plurality of stops which said finger is adapted to engage, means for selectively projecting said stops into the path of movement of said switch, and means for retracting said stops.

In witness whereof, I hereunto subscribe my name this 18th day of Nov. A. D., 1920.

LESTER L. LADD.