S. H. LIBBY.

ELECTRICALLY OPERATED I-BEAM SWITCH.

APPLICATION FILED OCT. 12, 1912.

1,091,677.

Patented Mar. 31, 1914.

2 SHEETS—SHEET 1.

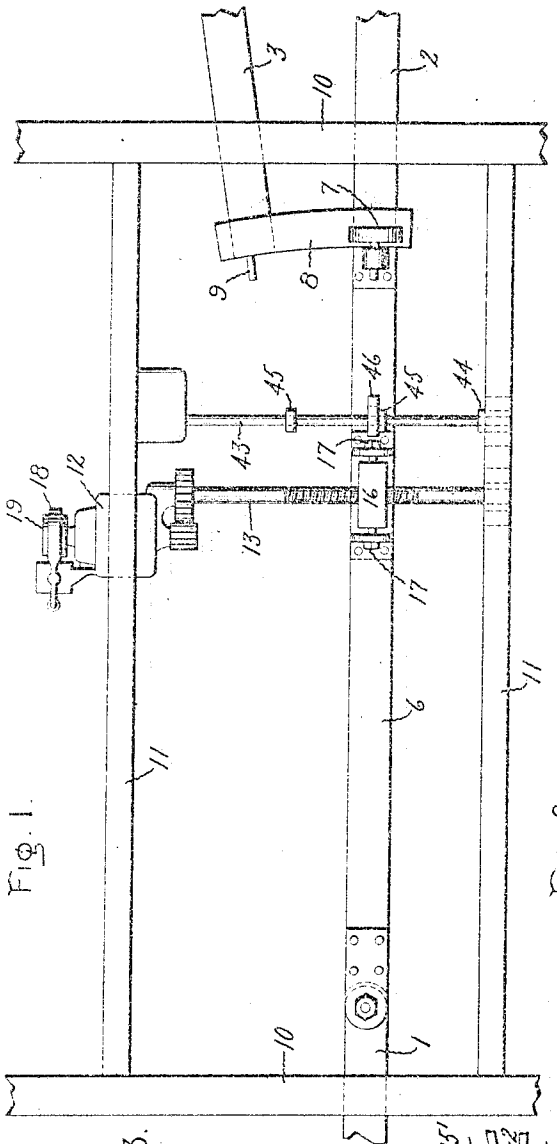


Fig. 1.

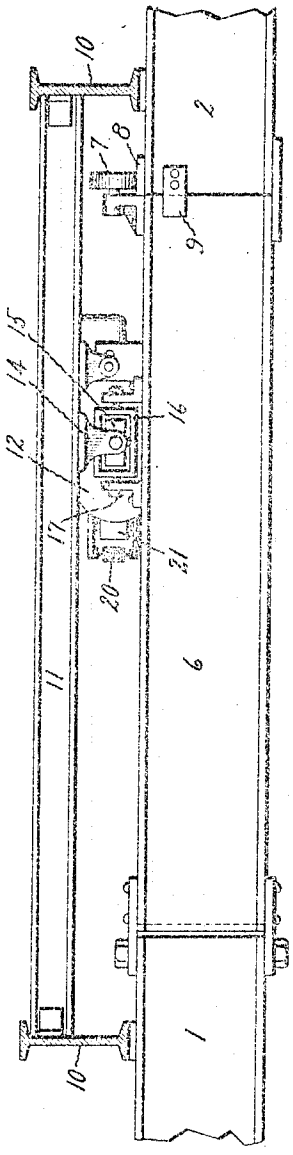


Fig. 2.

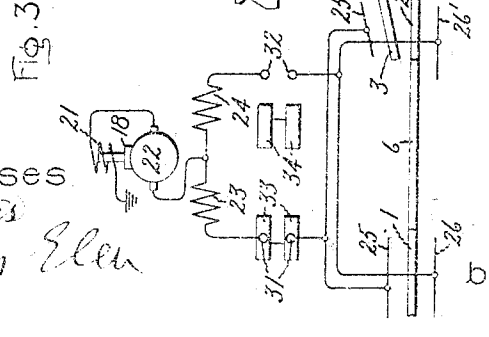


Fig. 3.

Witnesses
C. B. Stokes
J. Ellis Glen

Inventor
Sam H. Libby
by Albert G. Davis
His Attorney

S. H. LIBBY.

ELECTRICALLY OPERATED I-BEAM SWITCH.

APPLICATION FILED OCT. 12, 1912.

1,091,677.

Patented Mar. 31, 1914.

2 SHEETS—SHEET 2.

Fig. 5.

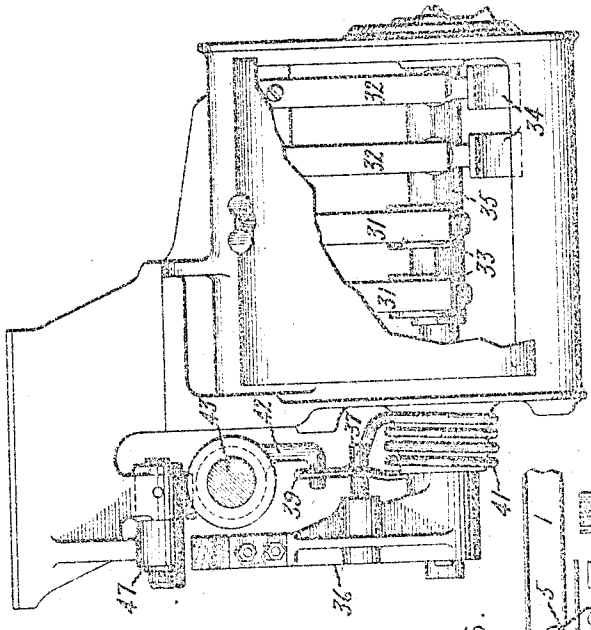


Fig. 6.

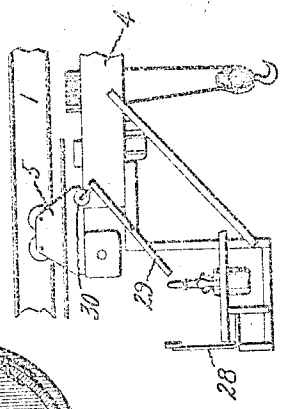
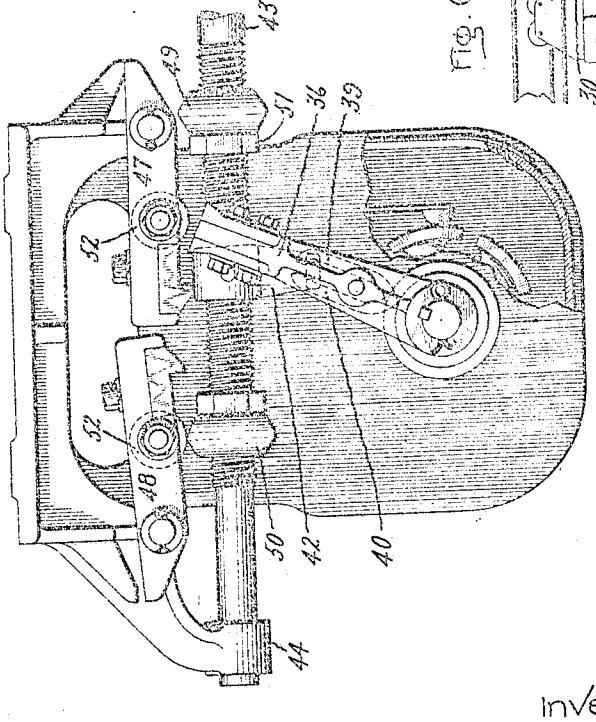


Fig. 4.



Witnesses
C. B. Stokes
J. Ellis Glen

Inventor
Sam H Libby
by Albert G. Davis
His Attorney

UNITED STATES PATENT OFFICE.

SAM H. LIBBY, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRICALLY-OPERATED I-BEAM SWITCH.

1,091,677. Specification of Letters Patent. Patented Mar. 31, 1914.

Application filed October 12, 1912. Serial No. 725,508

To all whom it may concern:

Be it known that I, SAM H. LIBBY, a citizen of the United States, residing at East Orange, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Electrically-Operated I-Beam Switches, of which the following is a specification.

This invention relates to switches for monorail runways for traveling cranes, and its object is to provide a switch having a movable tongue which can be thrown from one position to the other by the craneman on an approaching crane, in order to permit him to select which of two routes he will take upon reaching the point where said routes diverge. With this end in view, the switch tongue is connected to a reversible electric motor having preferably a divided field coil for running it in opposite directions. The terminals of said coils are connected to short lengths of switching conductor laid parallel with and adjacent to the trolley conductor for the traveling crane. By means of a movable contact, the craneman can connect the proper switching conductor with the trolley conductor and send current through the motor to throw the switch. A limit switch in circuit with the motor stops it promptly when the switch tongue comes in line with the proper track, and sets itself for a reverse rotation of the motor to throw the switch the other way when desired. The motor can be started from a crane coming in either direction, on either the main or branch track.

In the accompanying drawings, Figure 1 is a plan view of a switch embodying my invention; Fig. 2 is a side elevation thereof; Fig. 3 is a diagram of the motor circuit; Fig. 4 is a front elevation of the limit switch, on a larger scale and partly broken away; Fig. 5 is a side elevation of the limit switch, partly broken away, and Fig. 6 shows a portion of the crane.

The monorail track consists of I-beams, those constituting the main track being designated by the reference numerals 1, 2, while the branch track is numbered 3. The traveling crane 4 has trucks 5, of which one is shown in Fig. 6, and their wheels run on the lower flanges of the track beams, being driven by a suitable electric motor. The switch tongue 6 is a section of I-beam suitably pivoted at one end to the end of the track beam 1, so that its free end can be swung laterally into line with either the main track beam 2 or the branch track beam 3. This end of the switch tongue is preferably supported by a roller 7 running on a plate 8 which bridges the space between the tracks 2 and 3. Stops 9 on the two tracks insure the proper alinement therewith of the tongue 6.

Supported on the tracks is a frame composed of beams 10 and girders 11, on one of which is fastened an electric motor 12, geared to a screw-threaded shaft 13 which is suitably journaled in hangers 14 and extends transverse to and above the switch tongue. A nut 15 meshes with said screw and is mounted in gimbals on the switch tongue; the gimbal frame 16 being capable also of sliding endwise on its pivots 17. This method of mounting the nut enables it to ride back and forth on the screw in a straight line, while the switch tongue moves in the arc of a circle.

A friction brake 18 engages a brake wheel 19 on the shaft of the motor 12, and is normally set by a spring 20. An electromagnet 21 in circuit with the armature 22 of said motor serves to release said brakes when the current is turned on to start the motor, the brake going into operation automatically when the motor circuit is opened. The field coil of the motor is divided into halves 23, 24, one for moving the switch tongue one way and the other for the reverse movement. One terminal of the armature is connected between said halves of the field coil. The coil 23 is connected to short lengths 25, 25′ of switching conductor parallel with one side of the tracks 1 and 3, respectively, while the other coil 24 is connected with similar switching conductors 26, 26′, the former adjacent to the opposite side of the track 1, and the latter alongside the same side of the track 2.

On each side of the car 28 of the crane is a lever 29 carrying a contact 30 which can be forced up by the craneman to bridge the trolley conductor and a switching conductor on that side of the car. This sends current through the motor and causes the switch tongue to be thrown—the direction of movement being toward that side of the track on which the craneman has made contact with the switching conductor. Thus, if he closes the circuit upon 25 or 25′, the

tongue 6 will swing over into line with the branch track 3. If another craneman subsequently wishes to connect tracks 1 and 2, he energizes the conductor 26 or 26′, depending upon the direction in which he approaches the switch.

In order to stop the motor promptly when the switch tongue reaches the end of its throw, and also to provide for the reverse rotation of the motor when desired, a limit switch is mounted on the girder 11 near the motor. This switch is preferably of the double pole double throw type, controlling the connections of the two field coils with the switching conductors. A convenient construction is shown in Figs. 4 and 5. The pairs of fingers 31, 32 can be connected alternately by the bridging contact segments 33, 34 on a rotary spindle 35, on which is a lever 36 having a pin 37 thrust between the upright ends 39, 40 of a helical spring 41 coiled loosely around the spindle. A dog 42 on a rod 43 also engages the ends of the spring. The rod slides lengthwise in bearings 44 and has stops 45 between which plays a tappet 46 on the switch tongue. The stops are set a shorter distance apart than the travel of the tappet so that it will strike one or the other of them and slide the rod at each throw of the switch tongue. Pivoted above the end of the lever 36 are two catches 47, 48 adapted to engage therewith and detain it from moving. That portion of the rod adjacent to said catches is screw-threaded to receive two nuts 49, 50 having beveled peripheries which serve as cams to lift said catches. Lock nuts 51 secure the cam nuts in place when properly adjusted. The catches are preferably provided with antifriction rollers 52 with which said cam nuts engage.

The operation is as follows: Suppose the switch to stand as shown in Fig. 3, and a crane approaches along track 1. If the craneman wishes to run over on to track 3, he operates the contact lever 29 on the left hand side of his car so as to send current through the switching conductor 25. This starts the motor 12, which revolves the screw 13 and swings the switch tongue 6 over to the left. As it approaches the track 3, the tappet 46 strikes one of the stops 45 on the rod 43 and slides it to the left (in Fig. 4). The lever 36 is caught by the detent catch 47, but the dog 42 puts a tension on the spring 41, so that when in the movement of the rod the cam 49 strikes the roller 52 on the catch and trips it, the spring snaps the lever over to the end of its throw, and thereby carries the contact segments 33 away from the fingers 31 and closes the segments 34 upon the fingers 32. This puts the motor circuits in condition for a reverse movement of the switch when a craneman energizes the switching conductor 26 or 26′.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative, and that the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. The combination with a monorail runway, of a pivoted switch tongue, a screw for operating it, an electric motor geared to said screw, a rod actuated by said switch tongue, a switch controlling said motor, and a spring having one end engaged by said rod and the other connected to said switch.

2. The combination with a monorail runway, of a pivoted switch tongue, a screw arranged transverse thereto, a nut meshing with said screw and connected with said tongue by a gimbal joint, and a limit switch actuated by said tongue and controlling said motor.

3. The combination with a monorail runway, of a pivoted switch tongue, a screw for operating it, an electric motor geared to said screw, a sliding rod actuated by said switch tongue, a rotary switch controlling said motor, and a spring having one end engaged by said rod and the other connected to said switch.

4. The combination with a monorail runway, of a pivoted switch tongue, a screw for operating it, an electric motor geared to said screw, a sliding rod actuated by said switch tongue and carrying a dog and cams, a rotary switch controlling said motor and having a lever, a spring having its ends engaged by said dog and said lever, and catches adapted to engage said lever and be tripped by said cams.

In witness whereof, I have hereunto set my hand this tenth day of October, 1912.

SAM H. LIBBY.

Witnesses:
ROGER H. BUTTERWORTH,
JOHN E. ALEXANDER.