

Improvements in or relating to power-operated signal control systems for railways and the like

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Improvements in or relating to Power-operated Signal Control Systems for Railways and the Like SPECIFICATION NO 770,187

INVENTORS: ROBERT DELL and WALTER OWEN By a direction given under Section 17 (1) of the Patents Act 1949 this application proceeded in the name of British Transport Commission, a public authority established by the Transport Act, 1947, of 55, Broadway, Westminster, London, S W 1.

The Patent Office, 4th Avenue, New York, N.Y. 10017-2400, U.S.A. like the term "signal control" being intended to include all the normal controlling operations performed from a signal cabin, such as the actuation of signals and the setting of points at junctions.

Power-operated signal control systems are in use in which the points and signals are controlled by electric circuits including contacts operated by the turning movement of rods the rods associated with a plurality of signals points or other operable devices being mounted in a frame and associated with interlocking mechanism consisting of a plurality of slide bars, one of which is coupled to each rod so as to be moved longitudinally when the rod is turned, and a plurality of interlocking bars extending in a direction at right angles to the slide bars the slide bars carrying dogs or projections and the interlocking bars carrying other projections the arrangement being such that movement of selected slide bars to predetermined positions displaces one or more interlocking bars, through interengagement of projections thereon to positions in which other projections on the said interlocking bars lie in the path of dogs or projections on other slide bars and prevent movement of those slide bars Power-operated signal control systems as defined in this paragraph are hereby improved and simplified by the invention in a power-operated signal control system as herein defined, and a further object is to improve and simplify the apparatus consisting of the interlocking mechanism and the points and signals. According to the invention in a power-operated signal control system as herein defined both the slide bars and the interlocking bars are flat metal strips separate pieces of metal being secured thereto by bolts or screws or the like to form the dogs and the projections on the interlocking bars co-operating with the said dogs.

Further according to the invention in a power-operated signal control system as herein defined the slide bars of the interlocking mechanism are uniformly spaced one from another and the interlocking bars are also spaced uniformly one from another both the slide bars and the interlocking bars being flat metal strips pierced at regular intervals to receive bolts screws or the like pieces of metal of predetermined shape and dimensions being secured to the said strips by such bolts screws or the like the pieces secured to the slide bars forming the dogs or like projections thereon and the pieces secured to the interlocking bars co-operating with the said dogs to displace the interlocking bars as the result of movement of the slide bars or 90 PATENT SPECIFICATION

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In witness whereof the undersigned, the said ROBERT DELL, of 551, Eton Avenue, Sudbury, in the County of Middlesex, and WALTER OWEN, of 19, Lomond Close, Wembley, in the County of Middlesex, both British Subjects, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates to power-operated signal control systems for railways and the like, the term "signal control" being intended to include all the normal controlling operations performed from a signal cabin, such as the actuation of signals and the setting of points at junctions.

Power-operated signal control systems are in use in which the points and signals are controlled by electric circuits including contacts operated by the turning movement of rods, the rods associated with a plurality of signals, points or other operable devices being mounted in a frame and associated with interlocking mechanism consisting of a plurality of slide bars, one of which is coupled to each rod so as to be moved longitudinally when the rod is turned and a plurality of interlocking bars extending in a direction at right angles to the slide bars, the slide bars carrying dogs or projections and the interlocking bars carrying other projections, the arrangement being such that movement of selected slide bars

to predetermined positions displaces one or more interlocking bars, through interengagement of projections 40 thereon to positions in which other projections on the said interlocking bars lie in the path of dogs or projections on other slide bars and prevent movement of those slide bars Power-operated signal control systems as defined in this paragraph are hereinafter referred to as power-operated signal control systems as herein defined " In the power-operated signal control systems as herein defined which are now in use.

the rods operating the electric contacts are 50 each coupled to a separate rod in an interlocking frame supporting the slide bars and interlocking bars, and the slide bars and interlocking bars are formed of strips of metal parts of which are cut away to leave the dogs 55 or projections, the latter being integral with the strips.

The principal object of the present invention is to improve and facilitate the assembly of the interlocking mechanism of a 60 power-operated signal control system as herein defined, and a further object is to improve and simplify the apparatus consisting of the interlocking mechanism and the point and signal control contacts 65 According to the invention, in a power-operated signal control system as herein defined both the slide bars and the interlocking bars are flat metal strips, separate pieces of metal being secured thereto by bolts, screws 70 or the like to form the dogs and the projections on the interlocking bars co-operating with the said dogs.

Further, according to the invention, in a power-operated signal control system as 75 herein defined the slide bars of the interlocking mechanism are uniformly spaced one from another, and the interlocking bars are also spaced uniformly one from another, both the slide bars and the interlocking bars being formed of flat metal strips pierced at regular intervals to receive bolts, screws or the like, pieces of metal of predetermined shape and dimensions being secured to the said strips by such bolts, screws or the like, the pieces secured 85 to the slide bars forming the dogs or like projections thereon, and the pieces secured to the interlocking bars co-operating with the said dogs to displace the interlocking bars as the result of movement of the slide bars or 90 770,157 to prevent movement of a slide bar when an interlocking bar is in a predetermined position.

Preferably the contacts are operated directly by the rods to which the slide bars are coupled, each of the said rods having the contact operating mechanism at one end, and power actuating means for operating the rod from a remote point at the other end, the mechanical interlocking mechanism, an electric lock for retaining the rod in a set position until the train movement for which it was set has been completed, and a manual operating lever, being arranged along the rod in that order between the power actuating means and the contact operating mechanism.

The invention is hereinafter described with reference to the accompanying drawings, in which: Fig 1 is a front elevation of one form of apparatus embodying the present invention:

Fig 2 is a side elevation of the apparatus shown in Fig 1:

Fig 3 is a front elevation of some of the slide bars and interlocking bars of the interlocking mechanism the interlocking bars being shown in chain-dotted lines; and Fig 4 is a plan view showing the coupling means between a contact-operating rod and the slide bar associated therewith.

Referring to Figs 1 and 2 of the drawings, an upright rectangular frame 10, conveniently built up from H-section girders, is supported on vertically adjustable screws 11 to enable it to be accurately levelled regardless of irregularities in the floor surface on which it is supported Brackets 12, 13, 14 and 15 mounted on the frame carry bearings for a plurality of vertical rods 16, equally spaced one from another in a horizontal direction, the rods being disposed in a common plane parallel to that of the frame Each of the rods is movable through a predetermined angle by a double acting air pressure motor 17 controlled in any suitable manner from a remote point, the motor 17 acting on the lower end of the rod The upper part of each rod 16 carries a plurality of electric contacts 18 co-operating with fixed contacts on the frame to open and close electric circuits in accordance with the angular position of the rod Mechanical interlocking means, generally indicated by the reference 19 are positioned immediately above the air pressure motors 17, the interlocking means being more fully described below Above the mechanical interlocking means 19 each rod 16 has fixed thereto a quadrant 21, formed with apertures to receive a pin 22 urged upwardly by energisation of a solenoid 23 to lock the rod against movement Solenoids 23 are energised by the setting of the signal and point circuits to lock the appropriate rods 16 in the set positions and are de-energised by the passage of a train over the controlled section of track so that the settings cannot be changed until the train has passed.

Between the quadrant 21 and the contacts 18, each rod 16 carries a hand lever 24 serving both for manual operation of the rod and as a visual indication of its position.

It will be evident that the arrangement of the various mechanisms in the relative positions shown ensures that the contacts cannot 75 be operated by the air pressure motors unless the mechanical interlocking means and the electric lock permit.

The mechanical interlocking means 19, as shown in Fig 3 include a plurality of horizontally disposed slide bars 25 each having, as shown in Fig 4, an aperture 26 into which projects a pin 27 projecting laterally from one of the rods 16 one or more slide bars 25 being coupled to each rod 16 so that turning of any rod is accompanied by movement of one or more slide bars Each slide bar 25 comprises a flat metal strip drilled at equal intervals with pairs of holes 28 28 tapped to receive screws, bolts or the like the bars 90 being arranged in pairs each pair spaced vertically from the next.

Vertically disposed interlocking bars 29 are disposed in front of the slide bars 25, the interlocking bars 29 being equally spaced 95 one from another and like the slide bars, being formed with spaced pairs of holes 31, 31 the holes 31 being plain The interlocking bars 29 are spaced from the slide bars Dogs comprising flat metal plates 32, 100 each chamfered at 33 at one corner, are secured to the front faces of the slide bars by screws 34 entering pairs of holes 28, 28 in the said bars and similar plates 35, also chamfered at one corner 36 are secured 105 by screws 37 to the backs of the interlocking bars to form projections therein co-operating with the dogs, the plates 32 and 35 being drilled with holes corresponding in spacing to the holes forming the pairs in the 110 slide bars 25 and in the interlocking bars 29 respectively and the holes in the plates 35 being tapped.

It will be seen that by suitably relating the spacing of the pairs of holes 28 28 in the 115 slide bars to the spacing of the interlocking bars and by suitably relating the spacing of the holes 31 31 in the interlocking bars 29 to the spacing of the slide bars it is possible to provide for the mounting of a plate 32 on 120 any slide bar 25 in a position to co-operate with a plate 35 on any interlocking bar so that movement of the slide bar displaces the interlocking bar 29 upwardly and moves one or more other plates 35 thereon into the path 125 of the plates 32 on one or more other slide bars thus obstructing the movement of the said other slide bar or bars.

The following description which refers to

Fig 3 provides examples of the operation of 130 770,187 the interlocking mechanism. Four of the slide bars 25 shown are marked A, B, C and D respectively, and the two interlocking bars are marked X and Y. With the slide bar D in the position shown, the dog 32 on the slide bar B can slide to the left past the upper projection 35 on the interlocking bar Y, but, if the slide bar D is moved to the left, the chamfered corners 33 and 36 on the dog 32 of bar D and on the lower projection 35 of bar Y co-operate to lift the bar Y, thus causing the upper projection 35 on the bar Y to move into the path of the dog 32 on the bar B and prevent leftward movement of the latter. The interlocking bar X is divided, and, whilst the lower part of that bar is always lifted by leftward movement of the slide bar D, this movement is transmitted to the upper part, to restrain leftward movement of the slide bar A through the co-operating dog 32 and projection 35 on the said bars X and A, if the slide bar C is also moved to the left to insert the hinged arm 38, mounted on a plate screwed to the said slide bar C, between the projections 35 on the adjacent ends of the upper and lower parts of the bar X.

It will be obvious that by suitable positioning of the dogs 32 and projections 35, any one or more interlocking bars may be moved by movement of a slide bar to prevent movement of one or more other slide bars, and the movement of an interlocking bar by a slide bar may be dependent on the position of another slide bar at that time.

The interlocking bars are preferably biased by gravity to their normal positions, being lifted by the interaction of the dogs and projections.

The plates 32 and 35 may be chamfered on two corners so as to be able to co-operate during movement of the slide bars in either direction.

It will be seen that, to assemble an interlocking mechanism for any signal installation it is necessary only to have a supply of slide bars, interlocking bars and plates of a few standard shapes, it being then possible to arrange any desired combination of interlocks between signals points and the like merely by screwing the plates to the slide bars and interlocking bars in the appropriate positions.

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