July 26, 1938. A. G. KERSHAW 2,124,739

TRAILABLE POINT OPERATING MECHANISM FOR RAILWAYS AND THE LIKE

Filed March 5, 1936 5 Sheets-Sheet 1

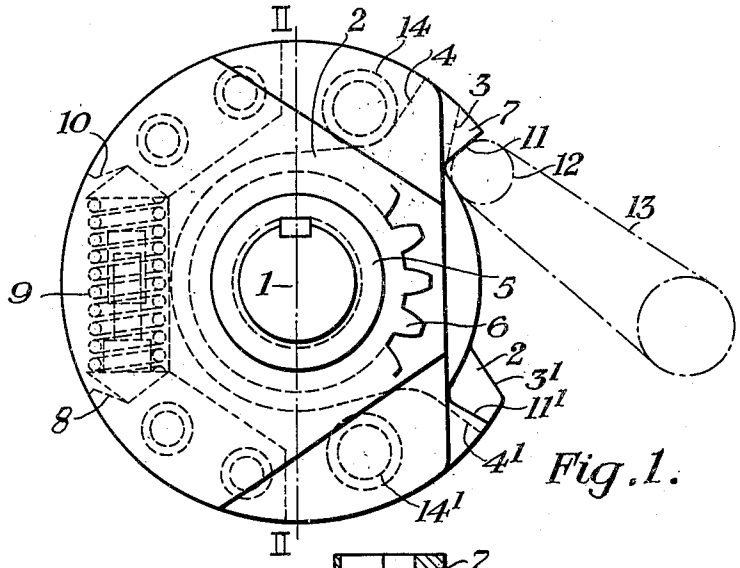


Fig. 1.

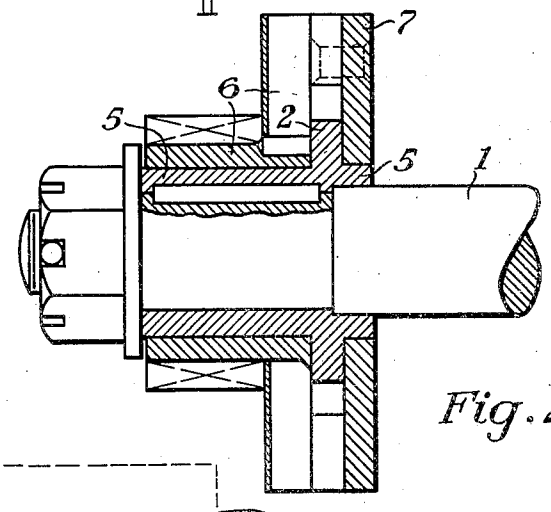


Fig. 2.

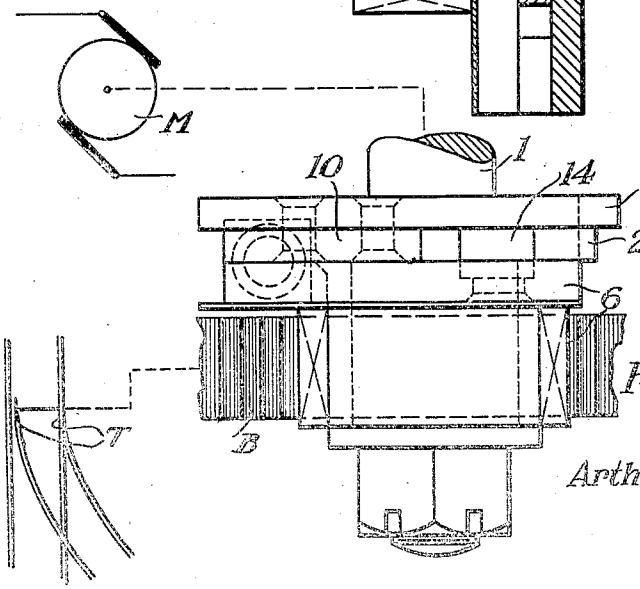


Fig. 3.

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TRAILABLE POINT OPERATING MECHANISM FOR RAILWAYS AND THE LIKE

Filed March 5, 1936 5 Sheets-Sheet 2

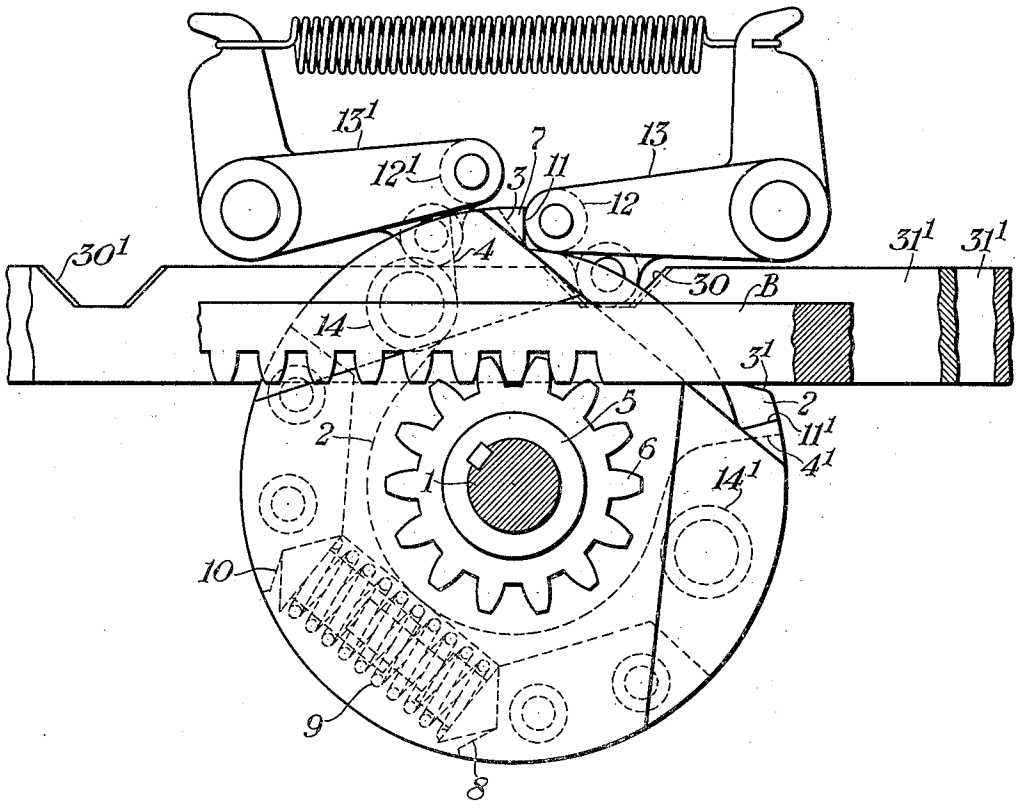


Fig. 1a.

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TRAILABLE POINT OPERATING MECHANISM FOR RAILWAYS AND THE LIKE

Filed March 5, 1936 5 Sheets-Sheet 3

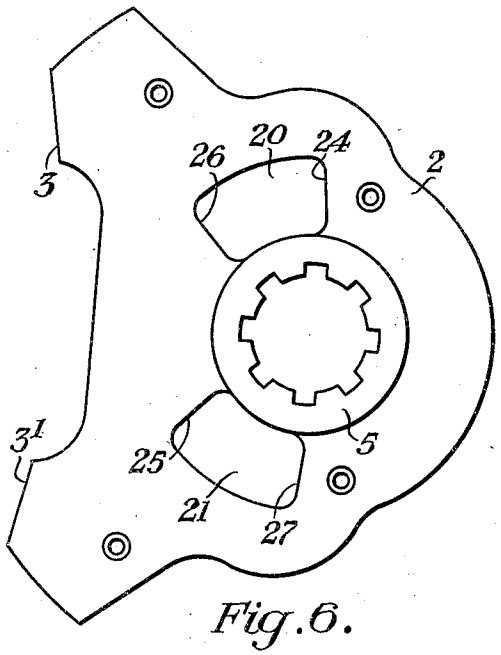


Fig. 6.

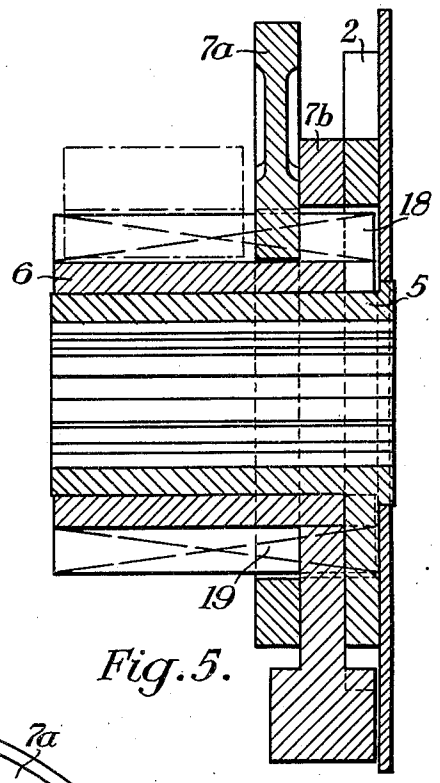


Fig. 5.

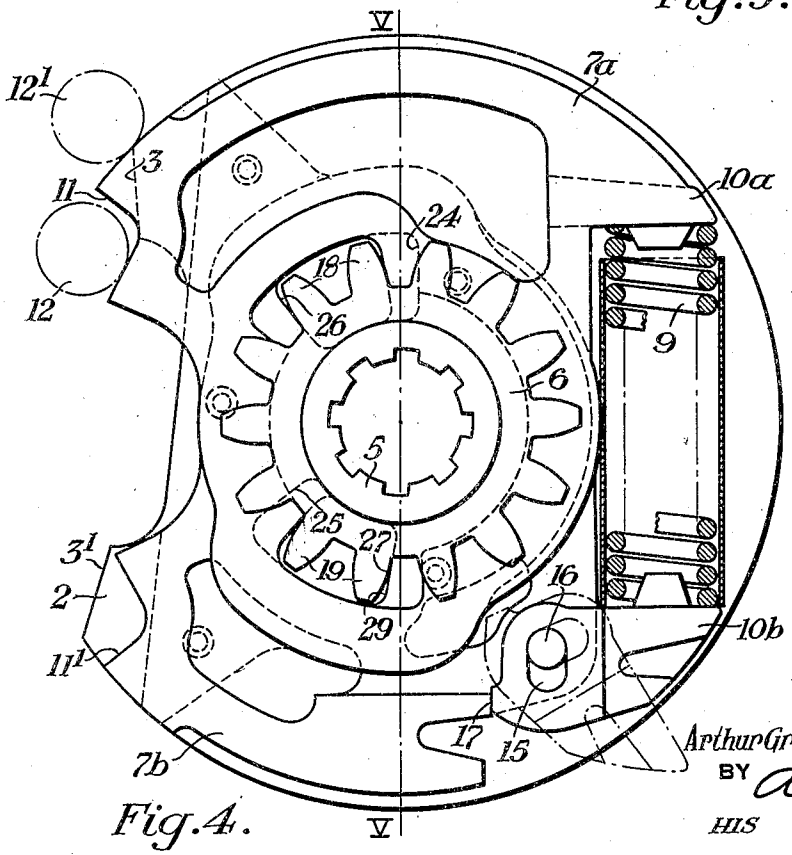


Fig. 4.

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July 26, 1938. A. G. KERSHAW 2,124,739

TRAILABLE POINT OPERATING MECHANISM FOR RAILWAYS AND THE LIKE

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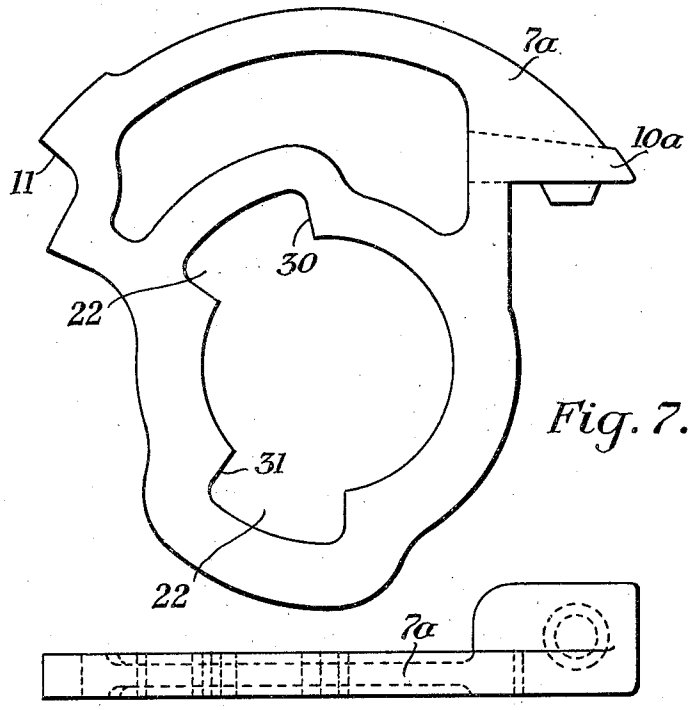


Fig. 7.

Fig. 8.

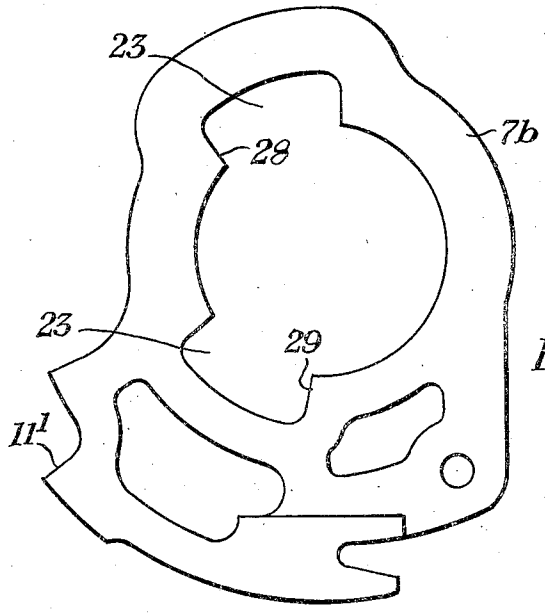


Fig. 9.

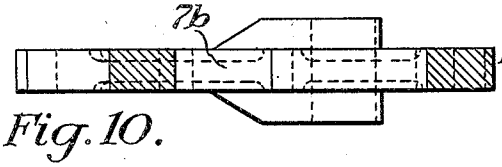


Fig. 10.

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TRAILABLE POINT OPERATING MECHANISM FOR RAILWAYS AND THE LIKE

Filed March 5, 1936 5 Sheets-Sheet 5

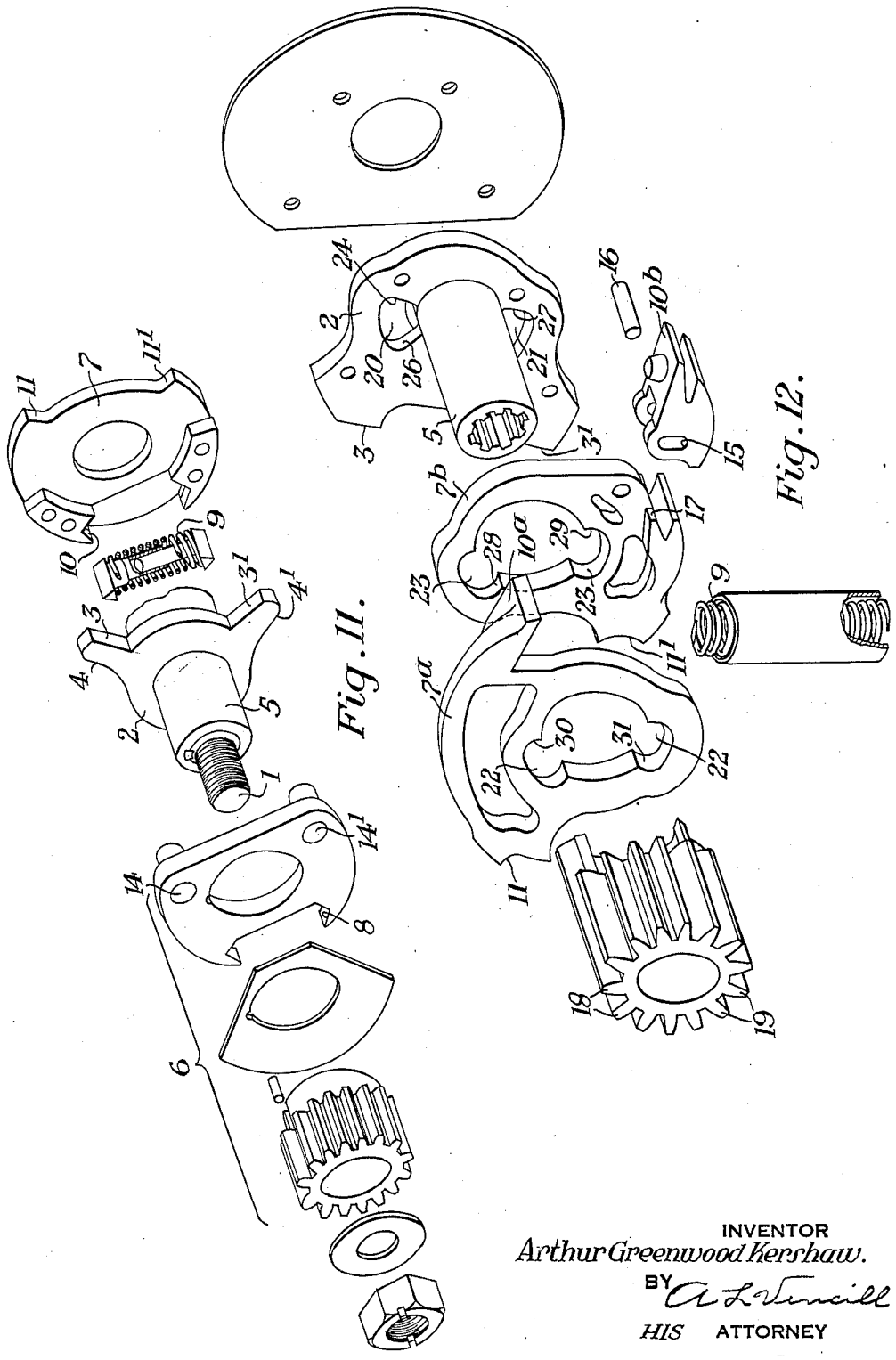


Fig. 11.

Fig. 12.

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Patented July 26, 1938

2,124,739

UNITED STATES PATENT OFFICE

2,124,739

TRAILABLE POINT OPERATING MECHANISM FOR RAILWAYS AND THE LIKE

Arthur Greenwood Kershaw, London, England, assignor, by mesne assignments, to The Union Switch & Signal Company, Swissvale, Pa., a corporation of Pennsylvania

Application March 5, 1936, Serial No. 67,400
In Great Britain March 16, 1935

4 Claims. (Cl. 246—240)

This invention relates to mechanism for operating railway points and the like of the kind adapted to permit the points to be trailed through by a train or vehicle and has for its object to provide an improved construction of mechanism of this character.

The invention more particularly relates to arrangements for automatically effecting the unlocking of the mechanism provided for retaining the points in the position to which they have been adjusted when a train or vehicle trails through the points so as to permit the necessary displacement of the point tongues.

According to the principal feature of the invention the locking mechanism above referred to comprises three coaxially arranged and relatively rotatable elements viz. a driving element adapted to be rotated by the electrically operated or other mechanism for setting the points to one or other of their extreme positions, a driven element which is operatively connected to the driving element in such a manner as to permit a predetermined amount of lost motion and is operatively connected to the point tongues and a locking element which is operatively connected to the driven element through a spring of predetermined strength, the locking element being adapted to cooperate with locking members retaining the point tongues in their fully set positions.

When the points are to be set from one position to another by the action of electrically operated or other mechanism the driving element is rotated and moves the corresponding locking member out of operative engagement with the locking element and as soon as the lost motion of the driving element necessary for this purpose has been effected, the continued rotation of this element effects the rotation of the driven element to set the points, a corresponding rotation of the locking element being also effected through the spring above referred to until when the points are fully set the locking element operatively engages with a locking member for retaining the points in their new position.

When on the other hand the points are being trailed through by a train or vehicle, the driven element is first rotated relatively to the locking element by the displacement of the points compressing the spring and during this relative movement drives the driving element to move the locking member out of operative engagement with the locking element thereby releasing the driven element and permitting the continued movement of the point tongues.

In a constructional embodiment of the invention adapted to permit trailing of the points with the latter either in the normal or reverse position, the locking element comprises two parts, one part of which is operatively connected to the driven element through the spring and the other part of the locking element for one direction of rotation of the driven element, the latter part of the locking element being operatively connected to the driven element through the spring and the first mentioned part of the locking element for the other direction of rotation of the driven element.

It will thus be evident that the points are held against displacement from their fully set position by the action of the spring above referred to which must be overcome by the trailing action of the train in displacing the points from this position and rotating the driven element relative to the locking element or one part of the latter as the case may be. By suitably proportioning the strength of the spring the points may thus be retained in their fully set position with a corresponding pressure.

In order that the invention may be readily understood it will now be described, by way of example, with reference to the accompanying drawings in which:

Figure 1 is a side view, Figure 2 a front view partly in section on the line II—II of Figure 1, and Figure 3 is a plan view of one constructional form of locking mechanism in accordance with the invention showing the mechanism connected with a pair of point tongues T.

Fig. 1*a* is a view similar to Fig. 1 showing the manner in which the locking mechanism cooperates with the rack bar B and the locking slides forming part of the point operating mechanism.

Figures 4–10 illustrate another constructional form of the invention in which the locking element comprises two parts,

Figure 4 being a side view of the locking mechanism,

Figure 5 a sectional view on the line V—V of Figure 4,

Figure 6 a side view of the driving element or disc,

Figure 7 a side view of one part of the locking element.

Figure 8 a plan view of this part of the locking element.

Figure 9 a side view of the other part of the locking element and,

Figure 10 a plan view of the latter part of the locking element.

Figure 11 is an exploded view showing in isometric projection the parts which go to make up

the locking mechanism illustrated in Figures 1, 2, and 3.

Figure 12 is a view similar to Figure 11 showing the parts which go to make up the modified form of locking mechanism illustrated in Figures 4 to 10, inclusive.

Referring first to Figures 1–3 and 11 the point operating mechanism may comprise an electric motor M of any suitable type operatively connected through speed reduction gearing and a clutch device (not shown in the drawings) to a shaft 1 on which the driving element is rigidly mounted, this element being constituted by a disc 2 having cut-away portions terminating respectively in inclined faces or shoulders 3, 3' and in substantially radial shoulders 4, 4'. The disc is formed integral with a projecting sleeve 5 on each side, the driven element 6 being rotatably mounted on the sleeve 5 on one side of the disc 2 and the locking element 7 being similarly mounted on the sleeve 5 on the other side of the disc 2.

The driven element 6 comprises a toothed gear wheel arranged to intermesh with a sliding rack bar B connected to the point tongues T and is provided with a lug 8 against which one end of a compression spring 9 abuts, the other end of this spring abutting against a similar lug or projection 10 on the locking element 7. The latter is constituted by a disc having a cut-away portion terminating in radial faces or shoulders 11, 11' adapted to be engaged by locking rollers 12 and 12' carried at the free ends of locking members 13 and 13' adapted to engage in notches or recesses 30 and 30' in slides 31 and 31' adapted to be separately connected to the point tongues.

Extending from and carried by the driven element 6 are two studs 14, 14' adapted to cooperate with lost motion with the shoulders 4, 4' on the driving element or disc 2 as will hereinafter be described.

When the points are to be set from one position to another by the action of the electric motor, the driving element or disc 2 is rotated through the intermediary of the speed reduction gearing and clutch in a clockwise direction (Figures 1 and 1a). During the initial stage of rotation of the driving element or disc 2 the locking member 13 corresponding to the existing position of the points is moved by the corresponding inclined face or shoulder 3 on the driving element or disc 2 out of operative engagement with the corresponding radial face or shoulder 11 on the locking element 7 owing to the engagement of the locking roller 12 carried at the free end of this locking member 13 with the inclined face or shoulder 3. As soon as the lost motion between the shoulder 4' on the driving element 2 and the cooperating stud 14' on the driven element 6 necessary to effect unlocking of the points has been taken up and the shoulder 4' comes into contact with the stud 14', continued rotation of the driving element 2 effects the rotation of the driven element 6 to set the points, a corresponding rotation of the locking element 7 being also effected through the compression spring 9 abutting against the lugs or projections 10 and 8 on the locking and driven elements 7 and 6 until when the points are fully set, the locking element 7 operatively engages with the locking member 13' for retaining the points in their new position, the locking roller 12' of this locking member engaging with the radial face or shoulder 11' on the locking element 7.

When on the other hand the points are being trailed through by a train or vehicle, the driven element 6 is first rotated, by the displacement of the points, in a clockwise direction (Figure 1) relatively to the locking element 7 through the intermediary of the rack bar engaging with the gear wheel the spring 9 being compressed during this relative movement and the stud 14 on the driven element 6 cooperating with the shoulder 4 on the driving element 2 and rotating the driving element so as to move the locking member 13 out of operative engagement with the radial face or shoulder 11 on the locking element 7, owing to the engagement of the inclined face or shoulder 3 on the driving element 2 with the locking roller 12 on the locking member 13, thus releasing the driven element 6 and permitting the continued movement of the point tongues.

Referring now to Figures 4–10 and 12, in which the parts of the locking mechanism corresponding to similar parts of the locking mechanism of Figures 1–3 are given similar reference numerals, the locking element comprises two parts 7a and 7b having respectively the radial faces or shoulders 11, 11', these two parts 7a, 7b being operatively connected by the spring 9 cooperating with lugs or projections 10a, 10b on the parts 7a, 7b. The lug 10b is provided with an elongated aperture 15 and adapted to be secured to the part 7b by means of a bolt or pin 16 whilst abutting against the part 7b at 17, so that the spring 9 may readily be located and adjusted between the two parts 7a, 7b.

The parts 7a, 7b of the locking element, and the driven element or toothed gear wheel 6 are adapted to rotate on the bushing 5 to which the driving element or disc 2 is firmly secured and which is adapted to be rotated by the action of the electrically operated or other point actuating mechanism.

The driven element or toothed gear wheel 6 has two pairs of teeth 18, 19 which are elongated and project into apertures 20, 21, respectively, in the driving element or disc 2 and into recesses 22, 23 respectively in the parts 7a, 7b of the locking element, the outer substantially radial edges of these pairs of teeth being arranged to cooperate with the substantially radial edges of the apertures 20, 21 and of the recesses 22, 23 with a certain amount of lost motion.

Assuming that the points are in the normal position being locked in this position by the engagement of the normal locking roller 12 with the radial shoulder 11 of the part 7a of the locking element and that it is required to set the points to the reverse position, the bushing 5 and driving element or disc 2 are rotated in an anti-clockwise direction (Figure 4) by the action of the electrically operated or other point actuating mechanism.

The initial movement of the driving element or disc 2 brings the edges 24, 25 of the apertures 20, 21 in the disc 2 into contact respectively with the pairs of elongated teeth 18, 19 of the driven element or toothed gear wheel 6, and the normal locking roller 12 is moved out of the path of the radial shoulder 11 of the part 7a of the locking element thus unlocking the points. Further movement of the driving element or disc 2 in the same direction rotates the driven element or toothed gear wheel 6 and reverses the points through the intermediary of the rack bar cooperating with the gear wheel 6, and when the points are in the reverse position the reverse locking roller 12' moves into the path of and cooperates with the radial shoulder 11' of the

part 7b of the locking element behind which shoulder the inclined shoulder 3' of the driving disc 2 has moved during the initial movement of the latter.

In setting the points from the reverse to the normal position the action of the mechanism is similar; the initial movement of the driving element or disc 2 in a clockwise direction brings the edges 26, 27 of the apertures 20, 21 of the driving disc 2 into contact respectively with the pairs of elongated teeth 18, 19 of the toothed gear wheel 6, and the reverse locking roller 12' is moved out of the path of the radial shoulder 11' of the part 7b of the locking element, thus unlocking the points. Further movement of the driving element or disc 2 in the same direction rotates the driven element or toothed gear wheel 6 and moves the points back to normal through the intermediary of the rack bar and when the points are in the normal position the normal locking roller 12 cooperates with the radial shoulder 11 of the part 7a of the locking element, behind which shoulder the inclined shoulder 3 of the driving disc 2 has moved during the initial movement of the latter.

When the points are trailed through in the normal position, the movement of the point tongues rotates the toothed gear wheel 6 in an anti-clockwise direction through the intermediary of the rack bar. The part 7a of the locking element is prevented from moving owing to the engagement of the normal locking roller 12 with the radial shoulder 11 on this part of the locking element, but the pairs of elongated teeth 18, 19 cooperating respectively with the edges 26, 27 of the apertures 20, 21 of the driving element or disc 2 rotate the latter so that the inclined shoulder 3 moves the normal locking roller 12 out of the path of the radial shoulder 11 on the part 7a of the locking element and unlocks the points, the inclined shoulder 3' at the same time being moved behind the radial shoulder 11' of the part 7b of the locking element. The part 7b of the locking element is also moved during this initial movement of the toothed gear wheel 6 and driving disc 2 owing to the engagement of the pair of elongated teeth 18, 19 with the edges 28, 29 respectively of the recesses 23 in the part 7b, which is moved relatively to the part 7a, whilst compressing the spring 9.

As soon as the points are unlocked however, the spring expands and pushes the part 7a in a counterclockwise direction until the edges 30, 31 come into contact with the pairs of elongated teeth 18, 19 respectively.

When the points are trailed through in the reverse position, the part 7b of the locking element is held fast by the reverse locking roller 12' and the toothed gear wheel 6 in its initial movement in a clockwise direction carries with it the driving element 2 and the part 7a of the locking element whilst compressing the spring 9, it being understood that the elongated teeth 18, 19 cooperate on the one hand with the edges 30, 31 of the part 7a and on the other hand with the edges 24, 25 of the driving disc 2.

As soon as the points are unlocked owing to the inclined shoulder 3' moving the reverse locking roller 12' out of the path of the radial shoulder 11' on the part 7b of the locking element, the part 7b will be moved by the expansion of the spring 9 until the edges 28, 29 engage with the pairs of elongated teeth 18, 19 respectively.

The points are therefore held against displacement from the normal and reverse positions by the action of the spring, which must be overcome by the trailing action of a train in displacing the points from these positions and rotating the driven element or toothed gear wheel relative to the locking element or a part of the latter.

It will be evident that the invention is not limited to the particular construction and arrangement of the parts hereinbefore described which may be varied as desired to suit particular requirements without exceeding the scope of the invention.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. Mechanism for operating railway points and the like adapted to lock the points in one extreme position and to unlock the points automatically when they occupy said one extreme position and a train trails the points, said mechanism comprising a driving element which is rotated between two extreme positions, a driven element mounted for rotation coaxially with said driving element and operatively connected with the point tongues, means for operatively connecting said driven element with said driving element in a manner permitting a limited amount of lost motion between said driven and driving elements, a locking element mounted for rotation coaxially with said driven element and operatively connected to said driven element through a spring of predetermined strength, a locking member for locking the points in one extreme position movable between a locking and an unlocking position and provided with a roller, a radial shoulder formed on said locking element and cooperating with said roller when said driving element is rotated to its one extreme position to normally retain said locking member in its locking position, and an inclined shoulder on said driving element cooperating with said roller when said driving element is moved away from its one extreme position to move said locking member to its unlocking position prior to any movement of said driven member.

2. Mechanism for operating railway points and the like adapted to lock the points in one extreme position and to unlock the points automatically when they occupy said one extreme position and a train trails the points, said mechanism comprising a driving element which is rotated between two extreme positions, a driven element mounted for rotation coaxially with said driving element and operatively connected with the point tongues, means for operatively connecting said driven element with said driving element in a manner permitting a limited amount of lost motion between said driven and driving elements, a spring of predetermined strength, a locking element mounted for rotation coaxially with said driven element and comprising two parts, one part of which is operatively connected to said driven element through the medium of said spring and the other part for one direction of rotation of said driven element and the other part of which is operatively connected to said driven element through the medium of said spring and said one part for the other direction of rotation of said driven element, a locking member for locking the points in one extreme position movable between a locking and an unlocking position and provided with a roller, a radial shoulder formed on the one part of said locking element and cooperating with said roller when said driving element is rotated to its one extreme position and said locking member is moved to its

locking position to normally retain said locking member in its locking position, and an inclined shoulder on said driving element cooperating with said roller when said driving element is moved away from its one extreme position to move said locking member to its unlocking position prior to any movement of said driven member.

3. Mechanism for operating railway points and the like adapted to lock the points in their extreme positions and to unlock the points automatically when a train trails the points, said mechanism comprising a driving element which is rotated between two extreme positions, a driven element mounted for rotation coaxially with said driving element and operatively connected with the point tongues, means for operatively connecting said driven element with said driving element in a manner permitting a limited amount of lost motion between said two elements, a locking element mounted for rotation coaxially with said driven element and operatively connected to said driven element through a spring of predetermined strength, two locking members, one for locking the points in one extreme position and the other for locking the points in the other extreme position and each movable between a locking and an unlocking position and each provided with a roller, two radial shoulders formed on said locking element one adapted when said locking element occupies its one extreme position and the one locking member is moved to its locking position to operatively engage the roller on said one locking member to retain said one locking member in its locking position and the other adapted when said locking element occupies its other extreme position and the other locking member is moved to its locking position to operatively engage the roller on said other locking member to retain said other locking member in its locking position, and two inclined shoulders on said driving element one cooperating with said one roller when said one locking member occupies its locking position and said driving member is moved away from its one extreme position to move said one locking member to its unlocking position prior to any movement of said driven member and the other cooperating with said other roller when said other locking member occupies its locking position and said driving member is moved away from its other extreme position to move said other locking member to its unlocking position.

4. Mechanism for operating railway points and the like adapted to lock the points in their extreme positions and to unlock the points automatically when a train trails the points, said mechanism comprising a driving element which is rotated between two extreme positions, a driven element mounted for rotation coaxially with said driving element and operatively connected with the point tongues, means for operatively connecting said driven element with said driving element in a manner permitting a limited amount of lost motion between said two elements, a spring of predetermined strength, a locking element mounted for rotation coaxially with said driven element and comprising two parts, one part of which is operatively connected to said driven element through the medium of said spring and the other part for one direction of rotation of said driven element and the other part of which is operatively connected to said driven element through the medium of said spring and said one part for the other direction of rotation of said driven element, two locking members, one for locking the points in one extreme position and the other for locking the points in the other extreme position and each movable between a locking and an unlocking position and each provided with a roller, a radial shoulder formed on the one part of said locking element and cooperating with said one roller when said driving element is rotated to its one extreme position and said one locking member is moved to its locking position to normally retain said one locking member in its locking position, a first inclined shoulder on said driving element cooperating with said one roller when said driving element is moved away from its one extreme position to move said one locking member to its unlocking position prior to any movement of said driven member, a radial shoulder formed on the other part of said locking element and cooperating with said other roller when said driving element is rotated to its other extreme position and said other locking member is moved to its locking position to normally retain said other locking member in its locking position, and a second inclined shoulder on said driving element cooperating with said other roller when said driving element is moved away from its other extreme position to move said other locking member to its unlocking position prior to any movement of said driven member.

ARTHUR GREENWOOD KERSHAW.