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(54) **Title:** SAFETY LOCK APPARATUS FOR A RAILWAY POINTS ARRANGEMENT

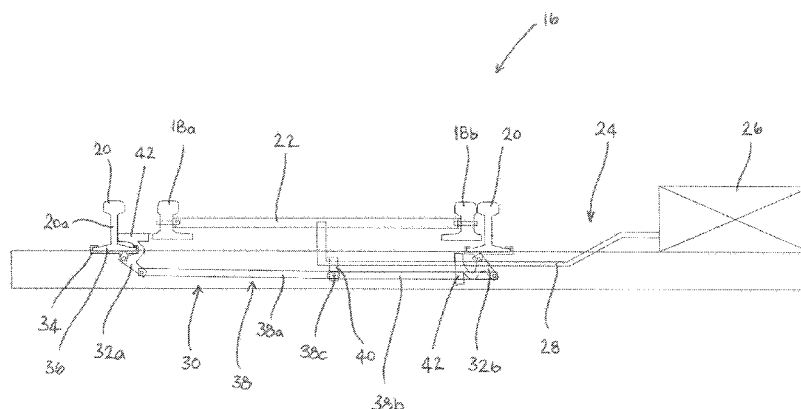


FIG. 2

(57) **Abstract:** A safety lock apparatus (30) for a railway points arrangement (16) comprises a pair of stock rails (20) and a pair of switch rails (18a, 18b) located between the stock rails (20) and movable simultaneously by an actuator arrangement (24). Each switch rail (18a, 18b) is movable transversely between a closed position in contact with one of the stock rails (20) and an open position spaced from the stock rail (20). The safety lock apparatus (30) comprises a blocking member (32a, 32b) which is connected to the actuator arrangement (24) and movable by the actuator arrangement (24) between an active position in which the blocking member (32a, 32b) is positioned in a gap between an open switch rail (18a, 18b) and an adjacent stock rail (20) and an inactive position in which the blocking member (32a, 32b) is positioned outside the gap. When the blocking member (32a, 32b) is in the active position, it prevents transverse movement of the switch rail (18a, 18b) from the open position to the closed position. When the blocking member (32a, 32b) is in the inactive position, it permits transverse movement of the switch rail (18a, 18b) from the open position to the closed position.

SAFETY LOCK APPARATUS FOR A RAILWAY POINTS ARRANGEMENT

Technical Field

- 5 The present disclosure relates generally to a safety lock apparatus for a railway points arrangement and/or to a railway points arrangement with improved operational safety. Embodiments of the present disclosure also provide a method for preventing transverse movement of a switch rail in a railway points arrangement.

Technical Background

- 10 Railway points, also known as railway track switches, are a necessary part of all railway networks as they enable different routes through the network to be selected. They are a critical part of the network as a points failure often leads to delays, re-routing and cancellations.

- 15 In a traditional set of railway points, movable switch rails are located between stock rails. The stock rails are securely fixed to prevent movement and the free ends of the switch rails, which are linked via one or more stretcher bars, slide transversely on suitable supports when commanded to move enabling either a straight route or a turnout
- 20 route to be selected. Upon request from the signalling system, an actuator, which forms part of the lineside points operating equipment, moves the two switch rails via a linkage before locking the switch rails in position and communicating the detected position of the rails and the lock back to the signalling system. It is only once this process is complete that a train can be authorised to safely pass the railway track junction.

- 25 The stretcher bars ensure that the free ends of the switch rails move simultaneously, as a pair, when commanded to do so by the actuator. The stretcher bars also ensure that the switch rails are held spaced apart from each other at a predetermined distance and maintain one of the switch rails in the unloaded open position depending on the route
- 30 selected through the railway track junction, whilst the other switch rail is in the closed position. The stretcher bars are, therefore, a particularly important and safety critical component of a traditional set of railway points because if one or more of the stretcher

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bars fails, the switch rails can separate, thereby allowing an open unloaded switch rail to move to the closed position, and this has been known to cause catastrophic derailment of rolling stock. In view of this, stretcher bars are currently subject to a rigorous inspection and maintenance routine, but this is a time consuming and expensive exercise given the number of stretcher bars that are currently in use on the rail network. Further, any inspection and maintenance routine always carries with it the risk of human error which is undesirable in such a safety critical component.

Attempts have been made to provide a replacement for the conventional stretcher bar which is simpler to install and requires less maintenance and inspection. The present disclosure takes a different approach to improve the safety of a traditional set of railway points in which the free ends of the switch rails are linked via conventional stretcher bars, but could also be applied to railway points with modified stretcher bar arrangements.

Summary of the Disclosure

According to a first aspect of the present disclosure, there is provided safety lock apparatus for a railway points arrangement comprising a pair of stock rails and a pair of switch rails located between the stock rails and movable simultaneously by an actuator arrangement, each switch rail being movable transversely between a closed position in contact with one of the stock rails and an open position spaced from said one of the stock rails, wherein the safety lock apparatus comprises:

a blocking member connected in use to the actuator arrangement and movable by the actuator arrangement between an active position in which the blocking member is positioned in a gap between an open switch rail and an adjacent stock rail and an inactive position in which the blocking member is positioned outside the gap.

According to a second aspect of the present disclosure, there is provided a railway points arrangement comprising:

a pair of stock rails and a pair of switch rails located between the stock rails, each switch rail being movable transversely between a closed position in contact with one of the stock rails and an open position spaced from said one of the stock rails;

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an actuator arrangement for simultaneously moving the switch rails; and
safety lock apparatus comprising a blocking member connected to the actuator
arrangement and movable by the actuator arrangement between an active position in
which the blocking member is positioned in a gap between an open switch rail and an
5 adjacent stock rail and an inactive position in which the blocking member is positioned
outside the gap.

According to a third aspect of the present disclosure, there is provided a method for
preventing transverse movement of a switch rail in a railway points arrangement
10 comprising a pair of stock rails and a pair of switch rails located between the stock rails
and movable simultaneously by an actuator arrangement, each switch rail being
movable transversely between a closed position in contact with one of the stock rails
and an open position spaced from said one of the stock rails, wherein the method
comprises:

15 operating the actuator arrangement to move a blocking member connected to
the actuator arrangement between an active position in which the blocking member is
positioned in a gap between an open switch rail and an adjacent stock rail and an
inactive position in which the blocking member is positioned outside the gap.

20 When the blocking member is in the active position, it prevents transverse movement
of the switch rail from the open position to the closed position. When the blocking
member is in the inactive position, it permits transverse movement of the switch rail
from the open position to the closed position. Thus, in the event of failure of one or
more stretcher bars which hold the switch rails spaced apart from each other at a
25 predetermined distance, the blocking member, when in the active position, provides a
physical barrier which ensures that an open switch rail cannot move transversely from
the open position to the closed position. On the other hand, when the switch rails are
commanded to move by the actuator arrangement from the open position to the closed
position, the blocking member is moved by the actuator arrangement to the inactive
30 position, thus enabling an open switch rail to move transversely to the closed position
in contact with an adjacent stock rail.

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Because the blocking member and the switch rails are connected to, and driven by, the same actuator arrangement, the movement of the blocking member and the switch rails is fully coordinated. This ensures that the blocking member is always moved by the actuator arrangement to the active position between a switch rail and an adjacent stock rail when the switch rail is moved transversely by the actuator arrangement to the open position and that the blocking member is always moved by the actuator arrangement to the inactive position when the switch rail is commanded by the actuator arrangement to move transversely to the closed position in contact with an adjacent stock rail. In view of this, the safety lock apparatus can be easily retrofitted to an existing railway points arrangement and connected to its actuator arrangement. Installation of the safety lock apparatus is, thus, a relatively straightforward procedure.

The blocking member may be pivotally mounted at a position beneath the stock rail for rotational movement between the active and inactive positions. The pivot axis may be parallel to the longitudinal axis of the stock rail. Such an arrangement enables the blocking member to be connected with relative ease to the actuator arrangement which moves the free ends of the switch rails in the transverse direction.

The apparatus may comprise a mounting member which may be removably attached to the stock rail beneath the stock rail and the blocking member may be pivotally attached to the mounting member. The mounting member enables the blocking member to be retrofitted with ease to the stock rail.

The apparatus may comprise an actuating member which may be pivotally connected to the blocking member and which may be driven in use by the actuator arrangement to rotate the blocking member between the active and inactive positions.

The actuator arrangement may comprise an actuator means and the actuating member may be connected to, and driven by, the actuator means. The actuator means may be an actuator rod. The safety lock apparatus can, thus, be easily retrofitted to a conventional points arrangement by connecting the actuating member to the actuator means, e.g. the actuator rod.

The actuator means may be movable in a transverse direction and may be arranged to move the actuating member in the transverse direction. The transverse movement of the actuating member rotates the blocking member between the active and inactive positions.

The blocking member may include a blocking arm which may be positioned in the gap between an open switch rail and an adjacent stock rail when the blocking member is in the active position and which may be positioned in use below the stock rail, outside the gap, when the blocking member is in the inactive position.

A first end of the blocking arm may contact part of the stock rail when the blocking member is in the active position and in normal operation of the points arrangement. The first end of the blocking arm may, for example, contact the web of the stock rail. This can help to ensure that the blocking member is held securely in the active position.

A second end of the blocking arm may be spaced from the switch rail when the blocking member is in the active position and in normal operation of the points arrangement. The second end of the blocking arm may, for example, be at the same height as, and spaced from, the base of the switch rail when the blocking member is in the active position. Thus, the blocking member is unloaded under normal operating conditions which minimises wear and maintenance and maximises its useful operating life.

The blocking arm may be substantially horizontal when the blocking member is in the active position. This provides an optimum physical barrier between an open switch rail and an adjacent stock rail. The blocking arm may be substantially vertical when the blocking member is in the inactive position.

The safety lock apparatus may comprise first and second blocking members, the first blocking member being movable by the actuator arrangement between an active position in a gap between a first open switch rail and an adjacent first stock rail and an inactive position outside the gap, the second blocking member being movable by the

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actuator arrangement between an active position in a gap between a second open switch rail and an adjacent second stock rail and an inactive position outside the gap.

- 5 The first and second blocking members may be arranged so that when the first blocking member is in the active position, the second blocking member is in the inactive position, and so that when the first blocking member is in the inactive position, the second blocking member is in the active position. It will be understood that this arrangement is suited to a conventional points arrangement which is arranged so that when the first switch rail is in the closed position, the second switch rail is in the open position (e.g. 10 to select the straight route), and so that when the first switch rail is in the open position, the second switch rail is in the closed position (e.g. to select the turnout route). With such an arrangement, it is necessary that when one blocking member is in the active position, the other blocking member is in the inactive position.
- 15 The actuating member may be pivotally connected to the first and second blocking members and operable to simultaneously rotate the first and second blocking members between the active and inactive positions. Thus, the actuating member provides for coordinated and synchronised movement of the first and second blocking members to ensure that when one blocking member is in the active position, the other blocking 20 member is in the inactive position.

Brief Description of the Drawings

- Figure 1 is a diagrammatic plan view of a railway track junction and associated points arrangement which includes a safety lock apparatus according to the present disclosure;
- 25 Figure 2 is a cross-sectional view of the points arrangement of Figure 1 showing the detail of the safety lock apparatus with a first blocking member in an active position and a second blocking member in an inactive position; and
- Figures 3 to 5 are enlarged views showing the operation of the first blocking member in Figure 2 as it rotates from the active position shown in Figures 2 and 3 to the inactive 30 position shown in Figure 5.

Detailed Description of Embodiments

Embodiments of the present disclosure will now be described by way of example only and with reference to the accompanying drawings.

5 A conventional railway track junction 10 which allows rolling stock to follow different routes through the rail network is illustrated in Figure 1. The railway track junction 10 includes a points arrangement 16, also known as a railway track switch, which enables different routes, for example a straight route 12 and a turnout route 14, to be selected through the railway track junction 10 by allowing rolling stock to transfer between
10 different railway tracks. The points arrangement 16 illustrated in Figure 1 comprises a traditional set of railway points in which movable switch rails 18, comprising first and second switch rails 18a, 18b, are located between stock rails 20. The stock rails 20 are securely fixed to prevent movement and the free ends of the switch rails 18 slide transversely on suitable supports when commanded to move by an actuator arrangement
15 24 enabling either the straight route 12 or the turnout route 14 to be selected.

Each switch rail 18 is movable between an open position in which it is spaced from a corresponding stock rail 20 to allow the passage of a wheel flange and a closed position in which it is in contact with the stock rail 20. In the configuration illustrated in Figure
20 1, it will be seen that the first switch rail 18a is in the open position and that the second switch rail 18b is in the closed position, thus enabling rolling stock to follow the turnout route 14. It will be understood that the actuator arrangement 24 can be operated to move the switch rails 18 to an alternative configuration (not illustrated) in which the first switch rail 18a is in the closed position and the second switch rail 18b is in the open
25 position, thus enabling rolling stock to follow the straight route 12.

The free ends of the switch rails 18 are linked via stretcher bars 22 spaced in the longitudinal direction of the rails and it will be understood that any suitable number of stretcher bars 22 can be used depending on the particular operational requirements. As
30 noted above, the stretcher bars 22 perform an important function because they ensure that the free ends of the switch rails 18 move simultaneously, as a pair, when commanded to do so by the actuator arrangement 24 and that the switch rails 18 are

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held spaced apart from each other at a predetermined distance. In the configuration illustrated in Figure 1 for example, it will be understood that the stretcher bars 22 hold the first switch rail 18a in the open position and under normal operating conditions prevent it from springing back towards the stock rail 20.

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The actuator arrangement 24 comprises a lineside actuator drive 26 positioned adjacent to the free ends of the switch rails 18 and an actuator means in the form of an actuator rod 28 which is displaced in the transverse direction by the actuator drive 26. The actuator rod 28 is connected to one of the stretcher bars 22 and transmits the movement from the actuator drive 26 to the switch rails 18, thereby moving the free ends of the switch rails 18 in the desired transverse direction.

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The points arrangement 16 includes a safety lock apparatus 30 which comprises first and second blocking members 32a, 32b which are pivotally mounted beneath the stock rails 20. Each blocking member 32a, 32b is movable between an active position in which it is positioned in a gap between an open switch rail 18 and an adjacent stock rail 20 and an inactive position in which it is positioned outside the gap. In the configuration shown in Figure 2, the first blocking member 32a is in the active position and acts as a physical barrier to prevent transverse movement of the first switch rail 18a from the open position to the closed position. Conversely, the second blocking member 32b is in the inactive position such that transverse movement of the second switch rail 18b has been possible from the open position to the closed position.

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The safety lock apparatus 30 comprises a mounting member 34 which is conveniently fitted to the base portion 36 of each stock rail 20 and each blocking member 32a, 32b is pivotally attached to the respective mounting member 34 such that its pivot axis is parallel to the longitudinal axis of the stock rail 20. An elongate actuating member 38, comprising a first actuating arm 38a and a second actuating arm 38b, extends transversely between the stock rails 20, beneath the actuator rod 28, and is pivotally connected at each end to the first and second blocking members 32a, 32b. The first and second actuating arms 38a, 38b are pivotally connected to each other at pivotal connection 38c to allow for the height difference as the first and second blocking

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members 32a, 32b rotate between the active and inactive positions. The actuating member 38 synchronises the rotational movement of the first and second blocking members 32a, 32b and moves them as a pair. It will, therefore, be apparent from Figure 2 that when the actuating member 38 moves transversely in the left hand direction viewed in Figure 2, the first blocking member 32a is rotated in the clockwise direction from the illustrated active position to the inactive position and that the second blocking member 32b is simultaneously rotated in the clockwise direction from the illustrated inactive position to the active position.

The first and second actuating arms 38a, 38b forming the actuating member 38 are connected to the actuator rod 28 by a coupling member 40 at the pivotal connection 38c. When the actuator rod 28 is moved transversely, to the left or right, by the actuator drive 26, the transverse motion is transferred by the coupling member 40 to the actuating member 38. Thus, it will be understood that when the actuator drive 26 is operated to displace the switch rails 18 in the transverse direction to select a desired route through the railway track junction 10, the first and second blocking members 32a, 32b are also caused to rotate, as a pair, about their respective pivot axes between the active and inactive positions.

Each blocking member 32a, 32b includes a blocking arm 42 which is located in the gap between an open switch rail 18 and an adjacent stock rail 20 when the blocking member 32a, 32b is in the active position. As is clearly shown in Figures 2 and 3, the blocking arm 42 adopts a substantially horizontal orientation when the first blocking member 32a (or the second blocking member 32b) is in the active position. Conversely, and as is clearly shown in Figures 2 and 5, the blocking arm 42 adopts a substantially vertical orientation beneath the stock rail 20 when the first blocking member 32a (Figure 5) or the second blocking member 32b (Figure 2) is in the inactive position. When the blocking member 32a, 32b is in the active position, it will be apparent from Figures 2 and 3 that a first end of the blocking arm 42 contacts the web 20a of the adjacent stock rail 20. This ensures that the blocking member 32a, 32b is held securely in the active position and eliminates any rotational play in the drive system. Conversely, a second end of the blocking arm 42 is spaced by a small distance from the base of the switch

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rail 18a, 18b thus ensuring that the switch rail 18a, 18b is unloaded under normal operating conditions.

As noted above, the points arrangement 16 illustrated in Figures 1 and 2 is in a configuration in which the switch rails 18 are set to select the turnout route 14. When
5 the configuration of the points arrangement 16 needs to be altered to select the straight route 12, the actuator drive 26 is commanded by the signalling system to transversely displace the actuator rod 28 in the left hand direction viewed in Figure 2 to move the switch rails 18 transversely so that the first switch rail 18a is moved from the open
10 position shown in Figures 1 to 3 to the closed position shown in Figure 5 and so that the second switch rail 18b is moved from the closed position shown in Figures 1 and 2 to the open position (not shown).

Referring to Figures 3 to 5, as the first switch rail 18a moves transversely from the open
15 position towards the closed position, the first blocking member 32a is rotated about its pivot axis in the clockwise direction viewed in the figures, thereby causing the blocking arm 42 to rotate transversely and downwardly out of the gap between the first switch rail 18a and the stock rail 20. It will be seen from Figures 3 to 5 that the rotational movement of the first blocking member 32a, and hence the blocking arm 42, and the
20 transverse movement of the first switch rail 18a are coordinated so that the first switch rail 18a can move unimpeded towards the stock rail 20 until it reaches the closed position shown in Figure 5. Such coordinated movement is readily achieved because the same actuator drive 26 is used to displace the switch rails 28 and the first and second blocking members 32a, 32b.

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As noted above, when the first switch rail 18a is in the closed position shown in Figure 5, the blocking arm 42 is in a substantially vertical orientation beneath the stock rail 20. When the actuator drive 26 is operated to move the first switch rail 18a from the closed position to the open position shown in Figures 2 and 3, it will be understood that the
30 first blocking member 32a is rotated about its pivot axis in the anti-clockwise direction viewed in the figures, thereby causing the blocking arm 42 to rotate transversely and upwardly into the gap between the first switch rail 18a and the stock rail 20.

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Although not illustrated, it will be readily understood that the second blocking member 32b moves in a corresponding manner between the active and inactive positions.

5 When the points arrangement 16 is operating normally, the blocking arms 42 of the first and second blocking members 32a, 32b are unloaded. However, if the stretcher bars 22 fail when the points arrangement 16 is in the configuration shown in Figures 1 and 2, the first switch rail 18a will have a tendency to spring back towards the adjacent stock rail 20 due to the inherent stiffness of the switch rail 18a. In this situation, the base of
10 the first switch rail 18a will come into contact with the second end of the blocking arm 42 and, thus, the blocking arm 42 will act as a physical barrier preventing transverse movement of the first switch rail 18a from the open position to the closed position and, thus, preventing the points arrangement 16 from adopting an unsafe configuration in which both the first and second switch rails 18a, 18b are in the closed position in contact
15 with their respective stock rails 20. In this situation, the points arrangement 16 would be jammed and inoperative, and a failure signal would be communicated via the actuator drive 26 to the signalling system as part of the existing obstacle detection system, thereby enabling the defective points arrangement 16 to be identified and remedial action to be taken.

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Although exemplary embodiments have been described in the preceding paragraphs, it should be understood that various modifications may be made to those embodiments without departing from the scope of the appended claims. Thus, the breadth and scope of the claims should not be limited to the above-described exemplary embodiments.
25 Each feature disclosed in the specification, including the claims and drawings, may be replaced by alternative features serving the same, equivalent or similar purposes, unless expressly stated otherwise.

Unless the context clearly requires otherwise, throughout the description and the claims,
30 the words “comprise”, “comprising”, and the like, are to be construed in an inclusive as opposed to an exclusive or exhaustive sense; that is to say, in the sense of “including, but not limited to”.

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Any combination of the above-described features in all possible variations thereof is encompassed by the present invention unless otherwise indicated herein or otherwise clearly contradicted by context.

Claims

1. Safety lock apparatus for a railway points arrangement comprising a pair of stock rails and a pair of switch rails located between the stock rails and movable simultaneously by an actuator arrangement, each switch rail being movable
5 transversely between a closed position in contact with one of the stock rails and an open position spaced from said one of the stock rails, wherein the safety lock apparatus comprises:
a blocking member movable by the actuator arrangement between an active position in which the blocking member is positioned in a gap between an open switch
10 rail and an adjacent stock rail and an inactive position in which the blocking member is positioned outside the gap.
2. Safety lock apparatus according to claim 1, wherein the blocking member is pivotally mounted in use at a position beneath the stock rail for rotational movement
15 between the active and inactive positions.
3. Safety lock apparatus according to claim 2, wherein the pivot axis is parallel to the longitudinal axis of the stock rail.
- 20 4. Safety lock apparatus according to claim 2 or claim 3, wherein the apparatus comprises a mounting member attached in use to the stock rail and the blocking member is pivotally attached to the mounting member.
5. Safety lock apparatus according to any of claims 2 to 4, wherein the apparatus
25 comprises an actuating member pivotally connected to the blocking member and driven in use by the actuator arrangement to rotate the blocking member between the active and inactive positions.
6. Safety lock apparatus according to any preceding claim, wherein the blocking
30 member includes a blocking arm which is positioned in use in the gap between an open switch rail and an adjacent stock rail when the blocking member is in the active position

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and positioned in use below the stock rail when the blocking member is in the inactive position.

7. Safety lock apparatus according to claim 6, wherein a first end of the blocking arm contacts part of the stock rail in normal operation of the points arrangement when the blocking member is in the active position.

8. Safety lock apparatus according to claim 7, wherein a second end of the blocking arm is spaced from the switch rail in normal operation of the points arrangement when the blocking member is in the active position.

9. Safety lock apparatus according to any of claims 6 to 8, wherein the blocking arm is substantially horizontal when the blocking member is in the active position.

10. Safety lock apparatus according to any of claims 6 to 9, wherein the blocking arm is substantially vertical when the blocking member is in the inactive position.

11. Safety lock apparatus according to any preceding claim, wherein the safety lock apparatus comprises first and second blocking members, the first blocking member being movable in use by the actuator arrangement between an active position in a gap between a first open switch rail and an adjacent first stock rail and an inactive position outside the gap, the second blocking member being movable in use by the actuator arrangement between an active position in a gap between a second open switch rail and an adjacent second stock rail and an inactive position outside the gap.

12. Safety lock apparatus according to claim 11, wherein the first and second blocking members are arranged so that when the first blocking member is in the active position, the second blocking member is in the inactive position, and so that when the first blocking member is in the inactive position, the second blocking member is in the active position.

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13. Safety lock apparatus according to claim 11 or claim 12 when dependent on claim 5, wherein the actuating member is pivotally connected to the first and second blocking members and operable to simultaneously rotate the first and second blocking members between the active and inactive positions.

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14. A railway points arrangement comprising:

a pair of stock rails and a pair of switch rails located between the stock rails, each switch rail being movable transversely between a closed position in contact with one of the stock rails and an open position spaced from said one of the stock rails;

10 an actuator arrangement for simultaneously moving the switch rails; and

safety lock apparatus comprising a blocking member movable by the actuator arrangement between an active position in which the blocking member is positioned in a gap between an open switch rail and an adjacent stock rail and an inactive position in which the blocking member is positioned outside the gap.

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15. A railway points arrangement according to claim 14, wherein the blocking member is pivotally mounted at a position beneath the stock rail for rotational movement between the active and inactive positions.

20 16. A railway points arrangement according to claim 15, wherein the pivot axis is parallel to the longitudinal axis of the stock rail.

17. A railway points arrangement according to claim 15 or claim 16, wherein the apparatus comprises a mounting member attached to the stock rail and the blocking member is pivotally attached to the mounting member.

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18. A railway points arrangement according to any of claims 15 to 17, wherein the apparatus comprises an actuating member pivotally connected to the blocking member and driven by the actuator arrangement to rotate the blocking member between the active and inactive positions.

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19. A railway points arrangement according to claim 18, wherein the actuator arrangement comprises an actuator means and the actuating member is connected to, and driven by, the actuator means.
- 5 20. A railway points arrangement according to claim 19, wherein the actuator means is movable in a transverse direction and is arranged to move the actuating member in the transverse direction to thereby rotate the blocking member between the active and inactive positions.
- 10 21. A railway points arrangement according to any of claims 14 to 20, wherein the blocking member includes a blocking arm which is positioned in the gap between an open switch rail and an adjacent stock rail when the blocking member is in the active position and positioned below the stock rail when the blocking member is in the inactive position
- 15 22. A railway points arrangement according to claim 21, wherein a first end of the blocking arm contacts part of the stock rail in normal operation of the points arrangement when the blocking member is in the active position.
- 20 23. A railway points arrangement according to claim 22, wherein a second end of the blocking arm is spaced from the switch rail in normal operation of the points arrangement when the blocking member is in the active position.
24. A railway points arrangement according to any of claims 21 to 23, wherein the
25 blocking arm is substantially horizontal when the blocking member is in the active position.
25. A railway points arrangement according to any of claims 21 to 24, wherein the
30 blocking arm is substantially vertical when the blocking member is in the inactive position.

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26. A railway points arrangement according to any of claims 14 to 25, wherein the safety lock apparatus comprises first and second blocking members, the first blocking member being movable by the actuator arrangement between an active position in a gap between a first open switch rail and an adjacent first stock rail and an inactive position outside the gap, the second blocking member being movable by the actuator arrangement between an active position in a gap between a second open switch rail and an adjacent second stock rail and an inactive position outside the gap.

27. A railway points arrangement according to claim 26, wherein the first and second blocking members are arranged so that when the first blocking member is in the active position, the second blocking member is in the inactive position, and so that when the first blocking member is in the inactive position, the second blocking member is in the active position.

28. A railway points arrangement according to claim 26 or claim 27 when dependent on claim 18, wherein the actuating member is pivotally connected to the first and second blocking members and operable to simultaneously rotate the first and second blocking members between the active and inactive positions.

29. A method for preventing transverse movement of a switch rail in a railway points arrangement comprising a pair of stock rails and a pair of switch rails located between the stock rails and movable simultaneously by an actuator arrangement, each switch rail being movable transversely between a closed position in contact with one of the stock rails and an open position spaced from said one of the stock rails, wherein the method comprises:

operating the actuator arrangement to move a blocking member connected to the actuator arrangement between an active position in which the blocking member is positioned in a gap between an open switch rail and an adjacent stock rail and an inactive position in which the blocking member is positioned outside the gap.

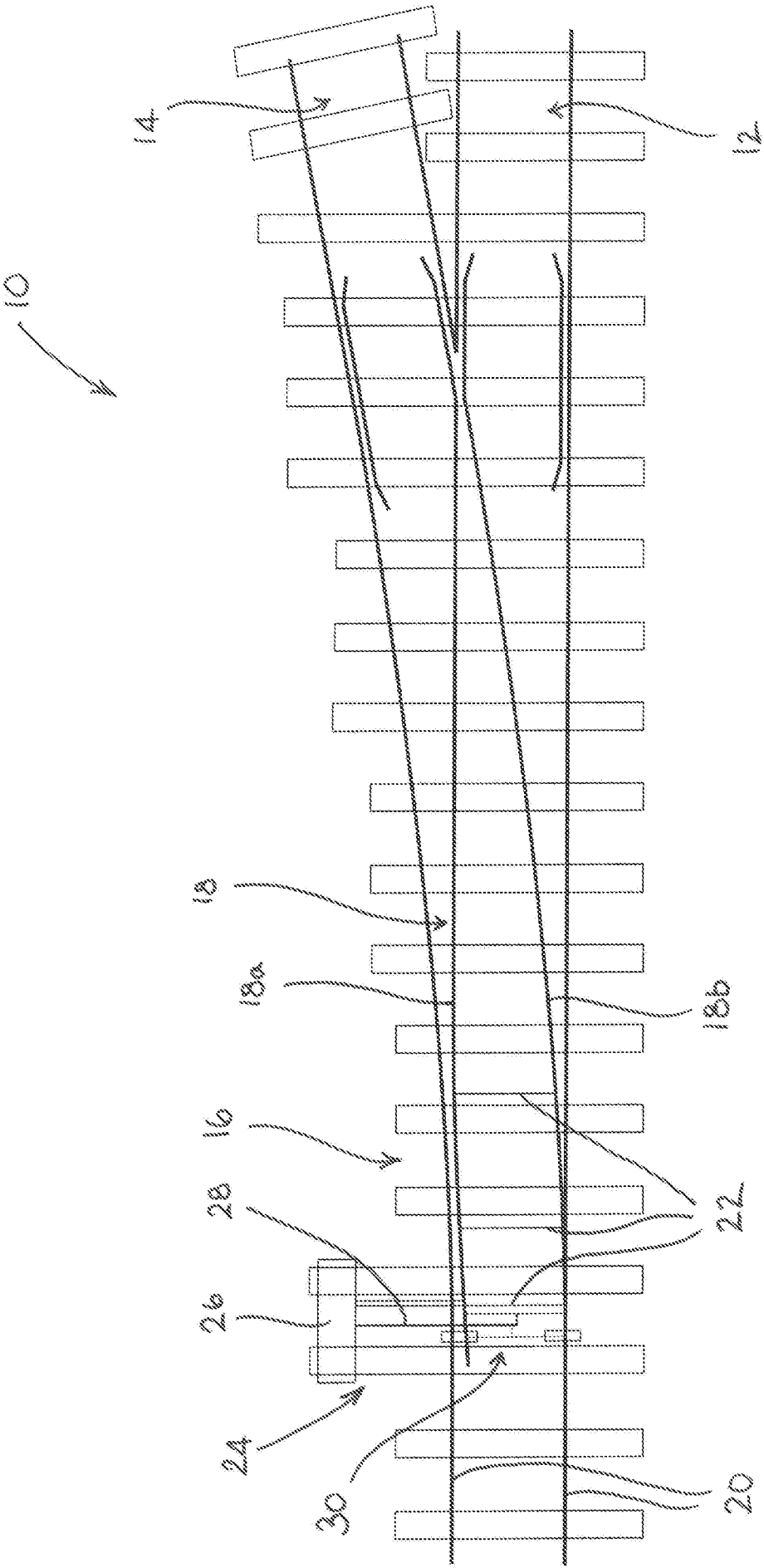
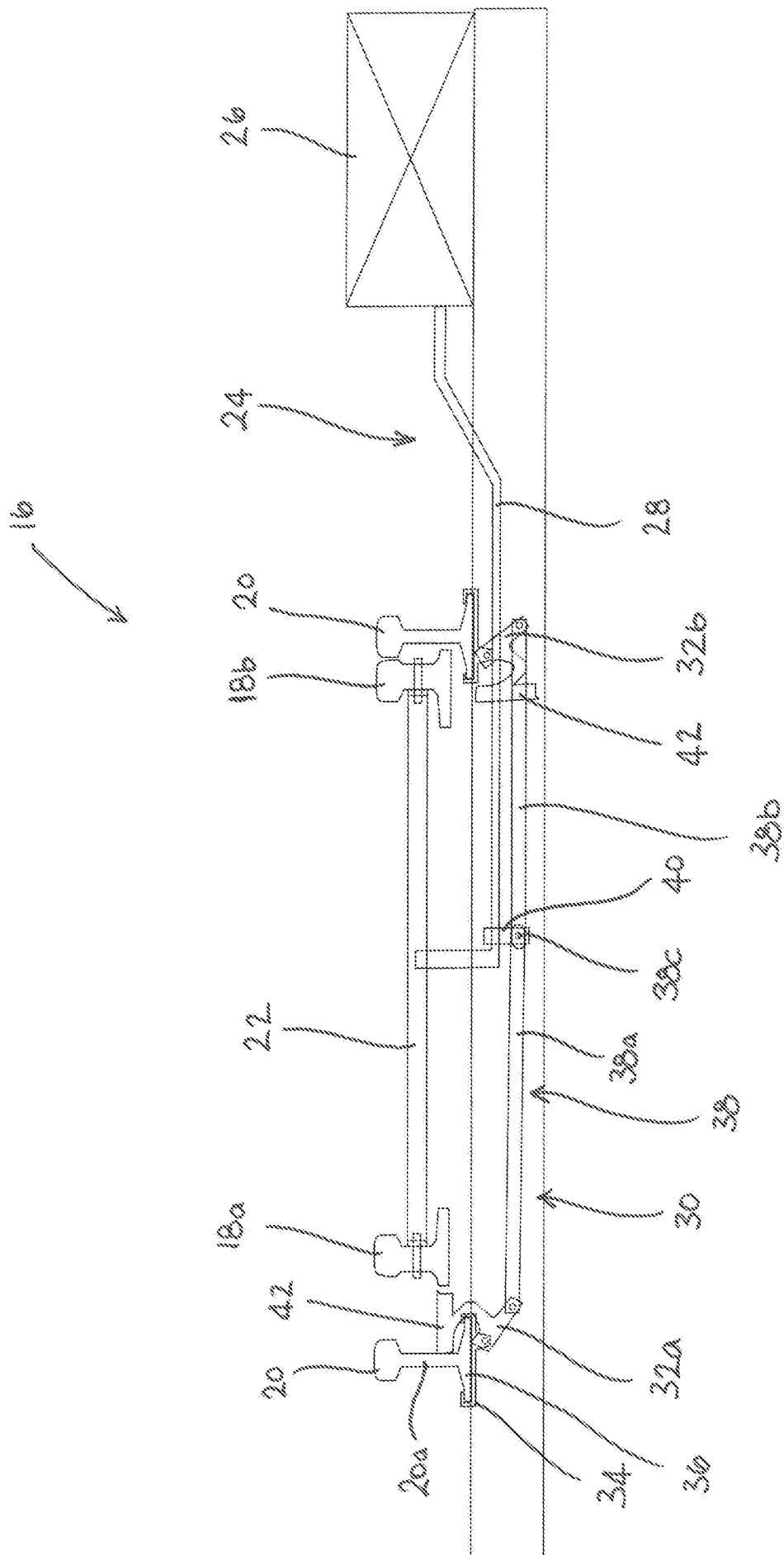


FIG. 1



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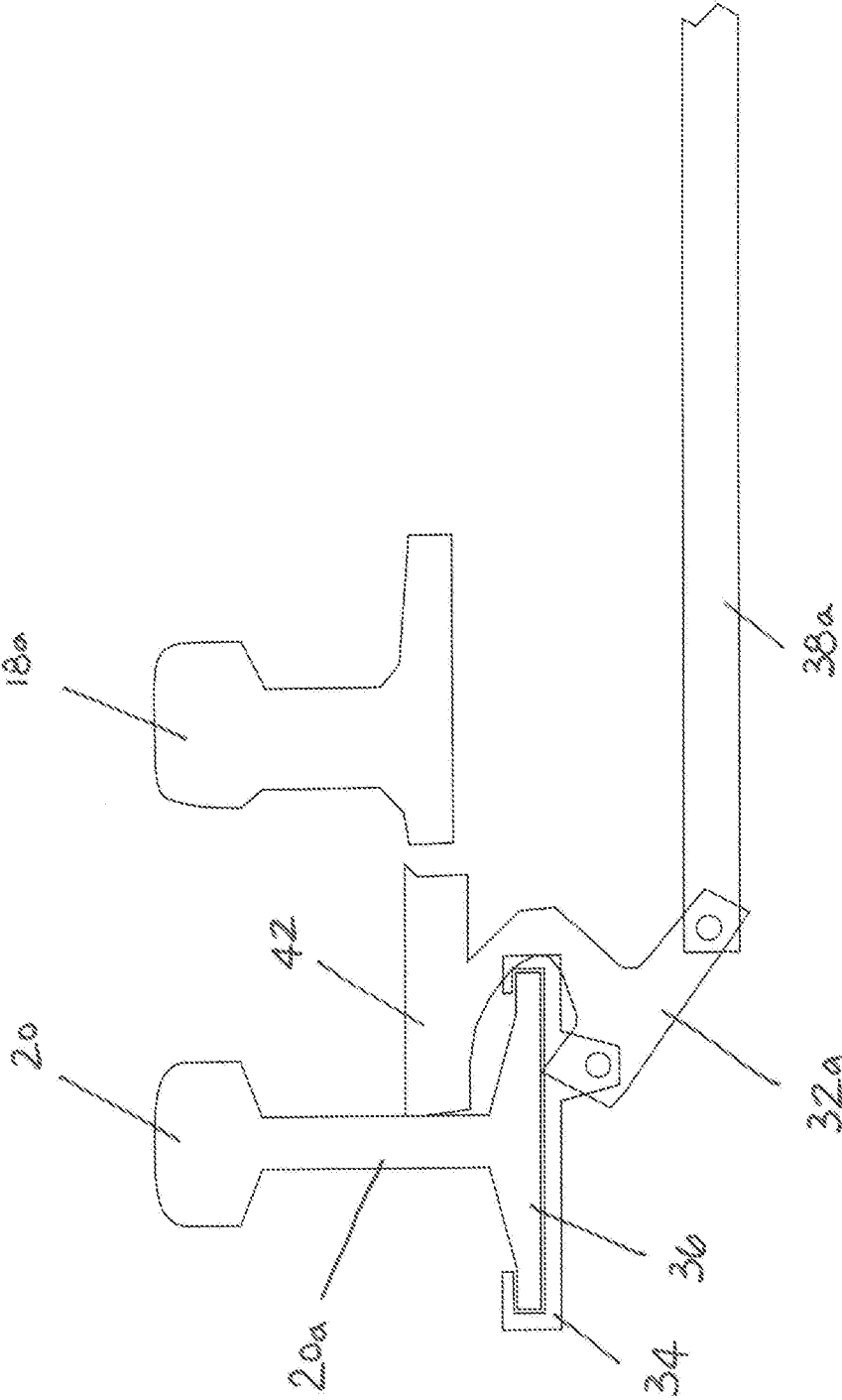


FIG. 3

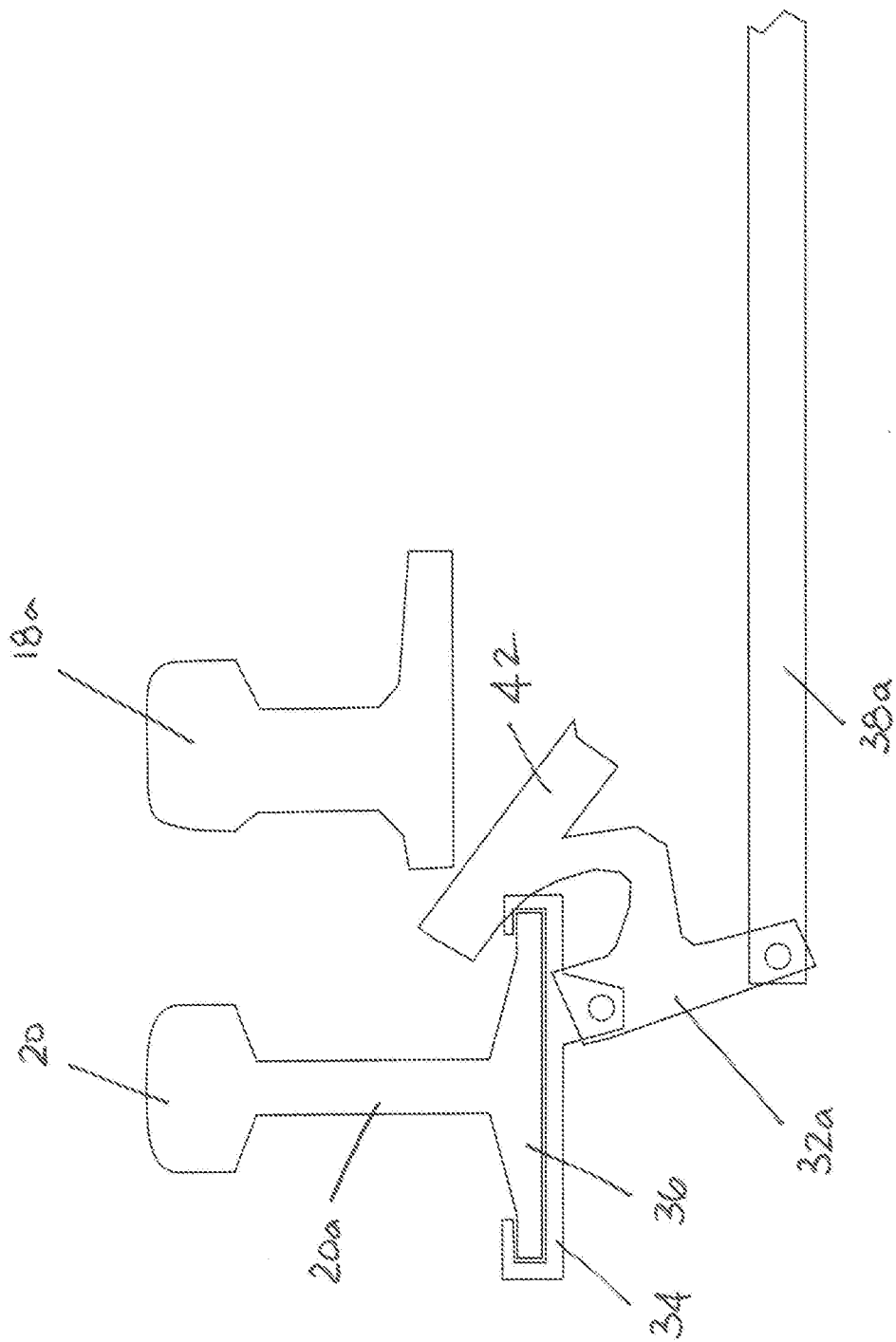


Fig. 4

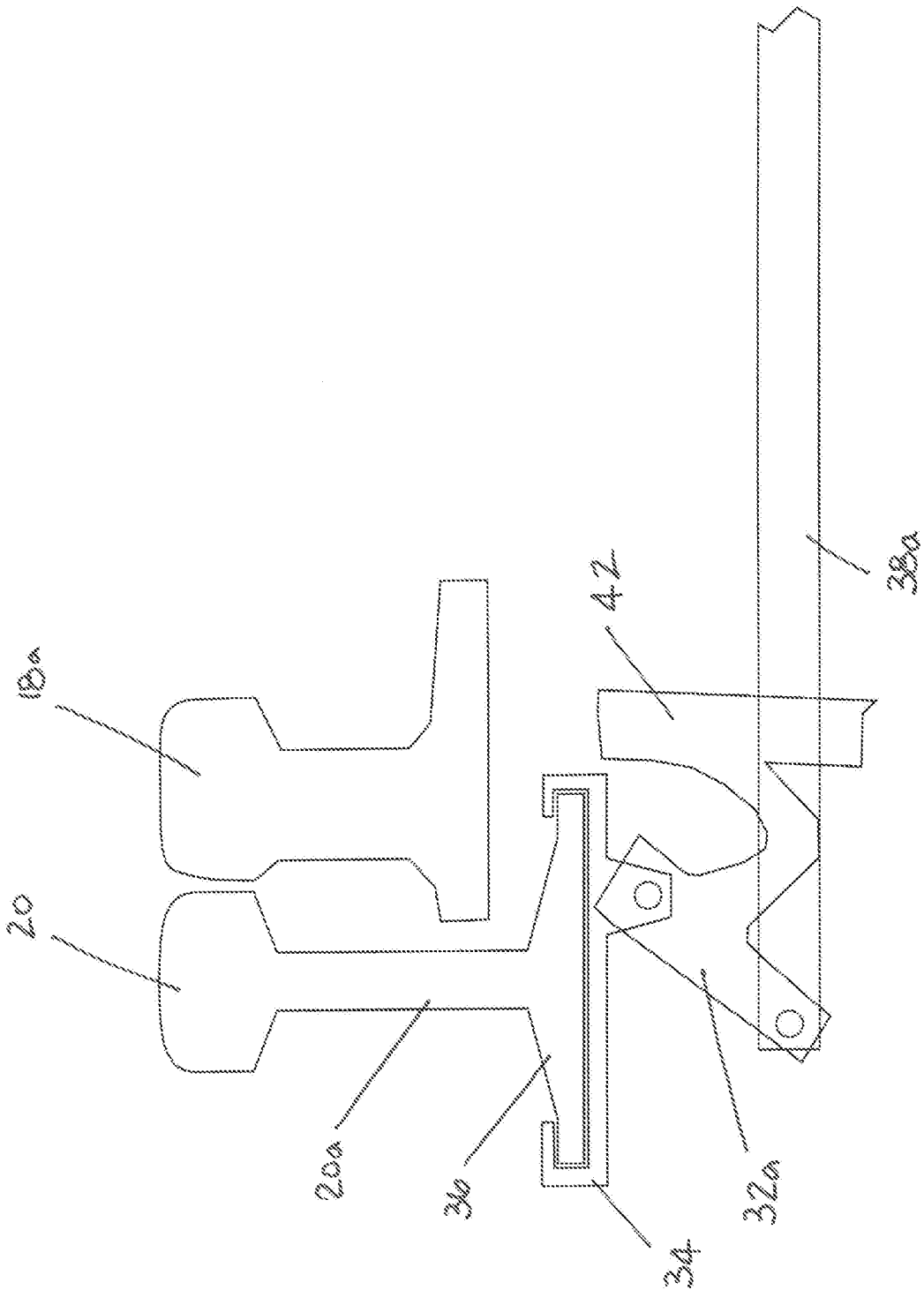


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2016/051616

A. CLASSIFICATION OF SUBJECT MATTER
INV. B61L5/10 E01B7/20
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B61L E01B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 463 074 A (JOHN II. PFLIEGER) 10 November 1891 (1891-11-10) figures 1,2 page 1, left-hand column, lines 18-23 page 1, left-hand column, line 29 - right-hand column, line 98 -----	1-29
A	EP 2 165 914 A1 (VAE EISENBAHNSYSTEME GMBH [AT]; VAE GMBH [AT]) 24 March 2010 (2010-03-24) paragraph [0016] - paragraph [0018] abstract; figures 1,2 -----	1-29
A	DE 10 2012 218557 B3 (UPZ SITECH GMBH [DE]) 13 March 2014 (2014-03-13) abstract; figure 1 paragraphs [0036] - [0037] ----- -/-	1-29



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See patent family annex.

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Date of the actual completion of the international search

27 September 2016

Date of mailing of the international search report

06/10/2016

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Robinson, Victoria

INTERNATIONAL SEARCH REPORT

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 74 03 608 U (RUHRTALER) 16 May 1974 (1974-05-16) figure 1 pages 2-3 paragraph spanning pages 8 and 9 -----	1-29
A	EP 1 762 454 A1 (SCHWIHAG GMBH [CH]) 14 March 2007 (2007-03-14) abstract; figures 7-11 paragraph [0001] - paragraph [0005] paragraph [0017] - paragraph [0019] -----	1-29

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2016/051616

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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