N. WHICHELLO & H. SAWYER.

TRANSIT DEVICE.

APPLICATION FILED SEPT. 29, 1913.

1,154,678.

Patented Sept. 28, 1915.

4 SHEETS—SHEET 1.

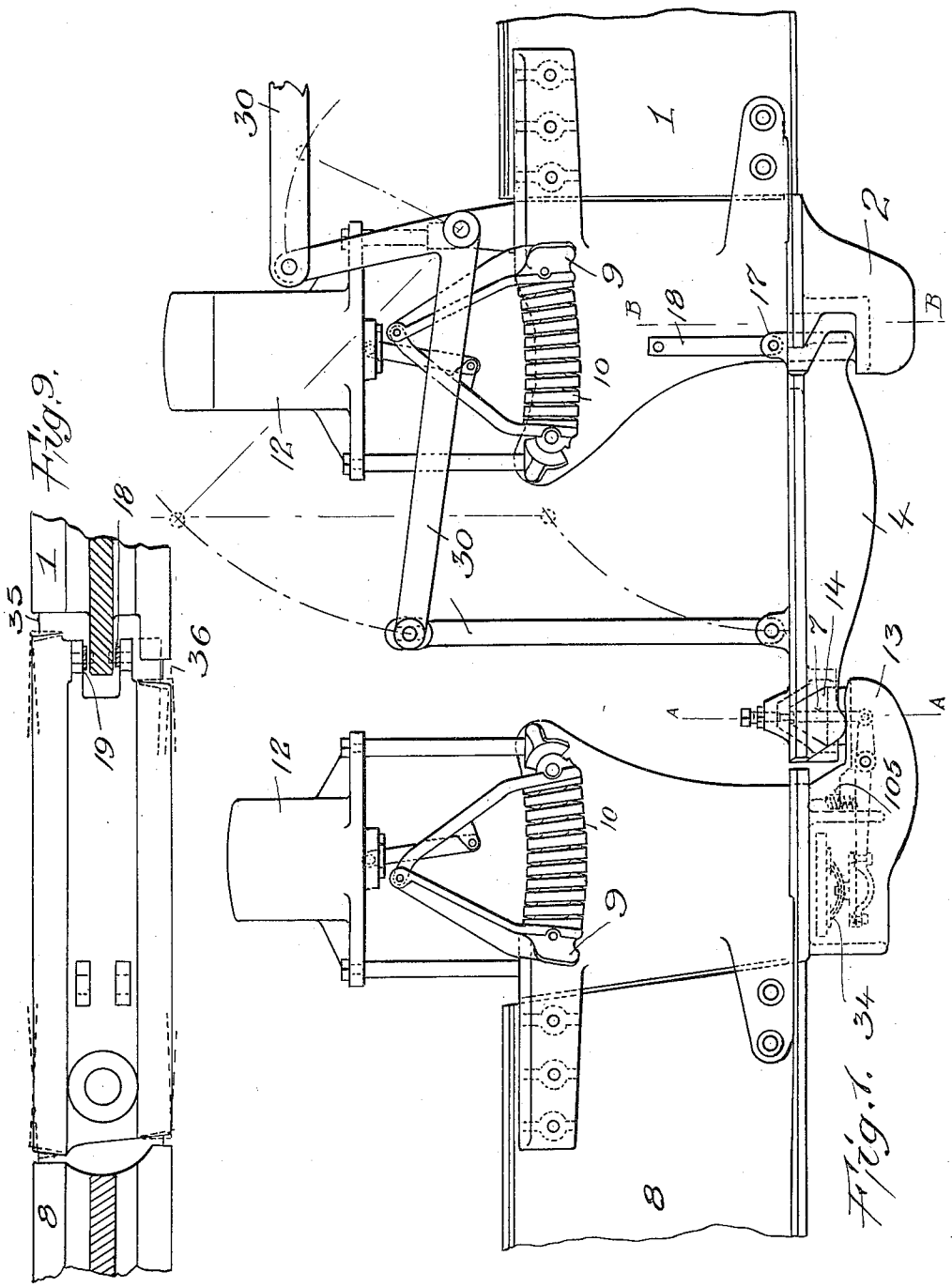

Fig. 9.

Fig. 1.

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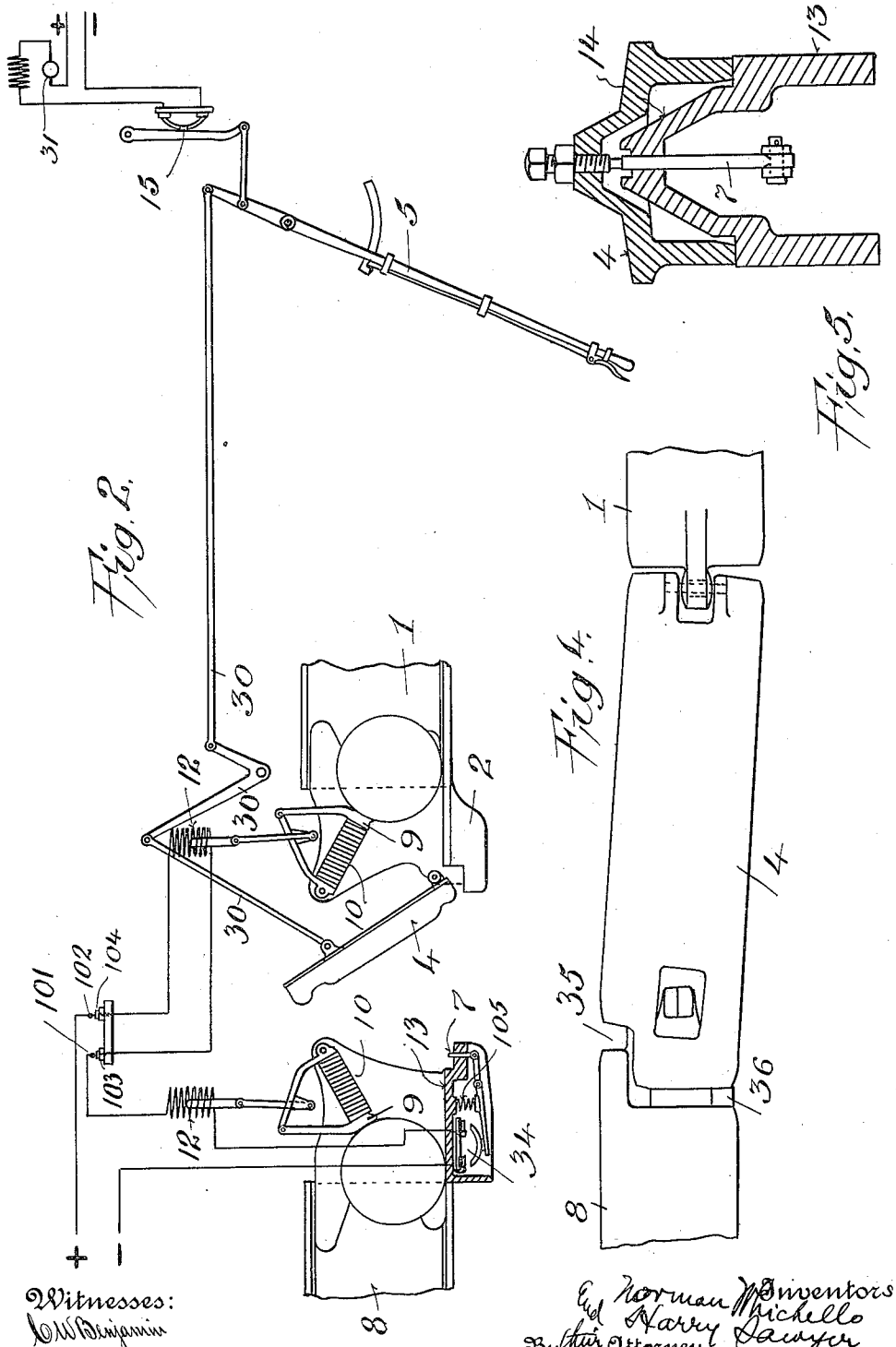

Fig. 2.

Fig. 3.

Fig. 4.

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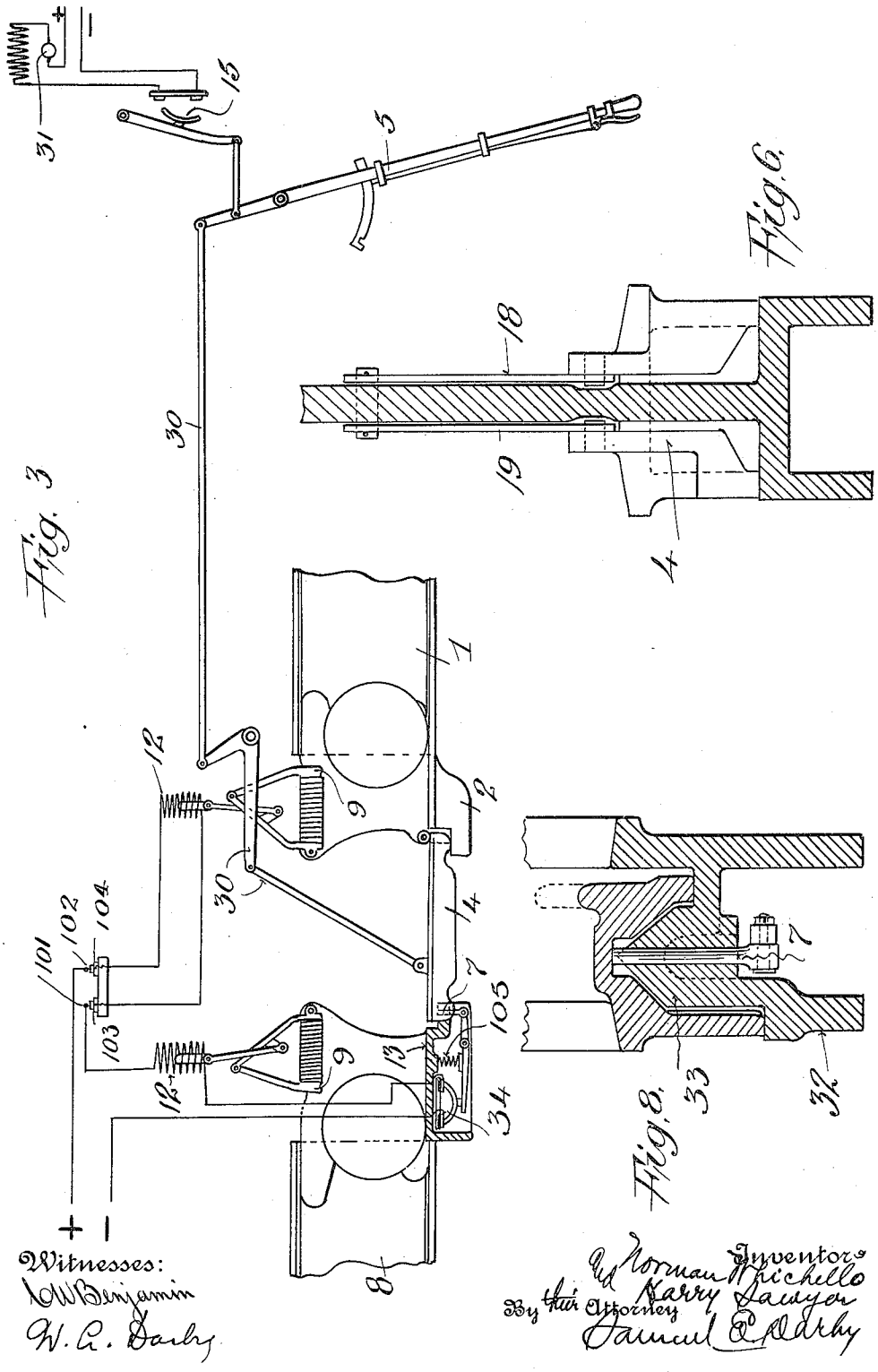

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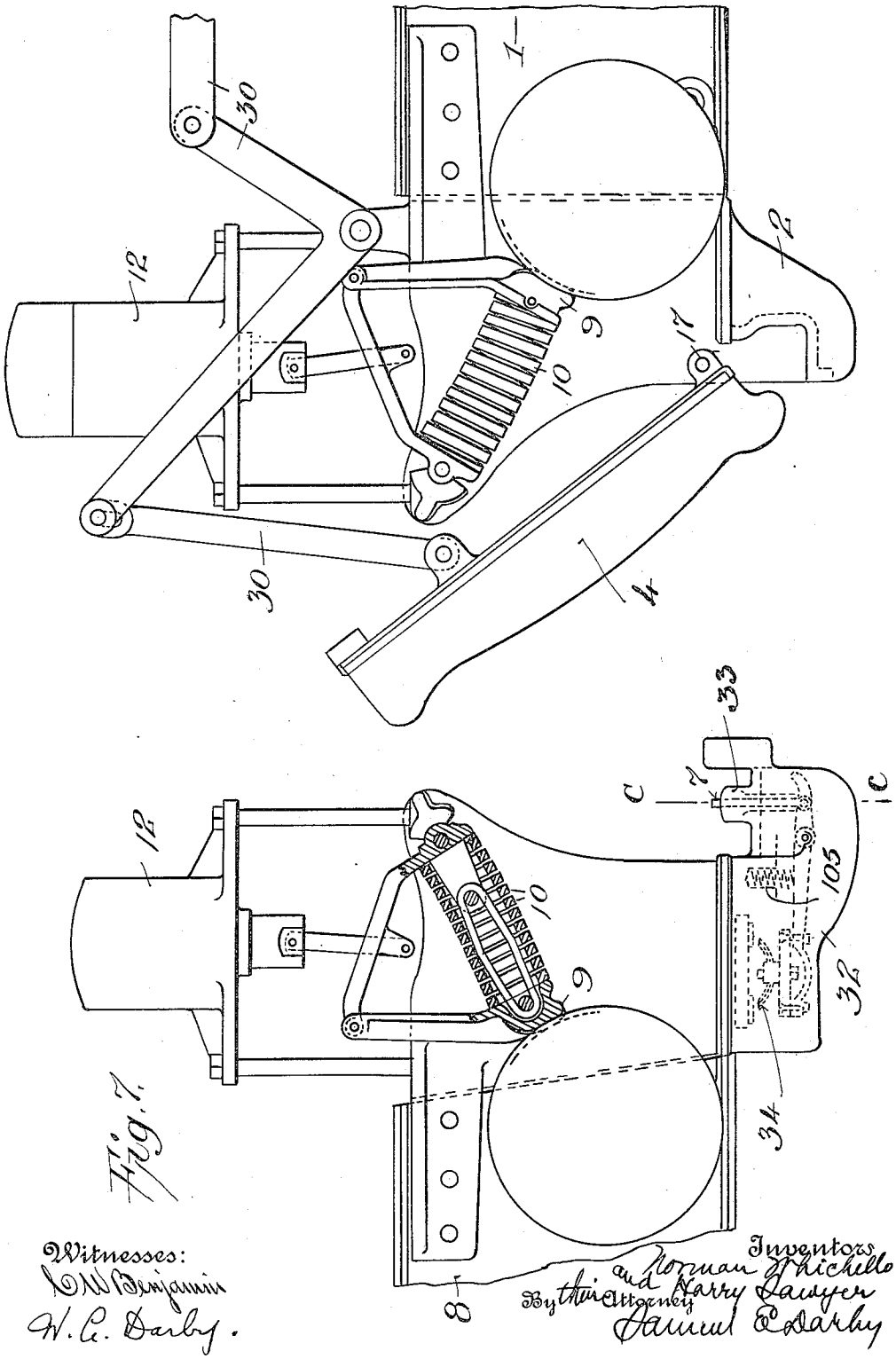

Fig. 7.

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UNITED STATES PATENT OFFICE.

NORMAN WHICHELLO AND HARRY SAWYER, OF MUSKEGON, MICHIGAN.

TRANSIT DEVICE.

1,154,678. Specification of Letters Patent. Patented Sept. 28, 1915.

Application filed September 29, 1913. Serial No. 792,419.

To all whom it may concern:

Be it known that we, NORMAN WHICHELLO, a subject of the King of England, and HARRY SAWYER, a citizen of the United States, and both residing at Muskegon, county of Muskegon, State of Michigan, have made a certain new and useful Invention in Transit Devices, of which the following is a specification.

The invention relates to transit devices.

The object of the invention is to provide a swinging bridge member for a traveling or movable crane, to connect the track rail of the moving crane with an associated track rail, so that a trolley may run safely from the one to the other, notwithstanding that those two track rails may not stand in exactly correct relative locations longitudinally vertically or laterally.

A further object of the invention is to provide safety buffers, which operate to prevent the trolley from running off of an open end of the track rails before the bridge member is in position to connect or bridge the space between said rails, and to be automatically raised out of the way of the trolley when the bridge member attains its connecting or bridging relation between the two tracks.

A further object of the invention is to provide means whereby the power which controls the lateral movement of one track is rendered inoperative when the bridge member is in connecting relation with the other track.

A further object is to provide means to automatically bring the bridge member into proper relation with the track when it is lowered into bridging position.

The invention consists substantially in the construction, combination, location and relative arrangement of parts, all as will be more fully hereinafter set forth as shown in the accompanying drawings and finally pointed out in the appended claims.

Referring to the accompanying drawings and to the various views and reference signs appearing thereon, Figure 1 is a view in side elevation showing a construction embodying the principles of our invention, parts broken off, and the bridge member in bridging relation between track rails of a monorail track system. Fig. 2 is a diagrammatic view showing the bridge in open position and the spring buffers employed as safety stops for the trolley in their normal positions, and also illustrates the electric circuits controlling the motor which operates the moving tracks and the safety buffers respectively. Fig. 3 is a view similar to Fig. 2, showing the bridge member in lowered position and its effect on the circuit controlling the movement of the buffers and also on the motor which controls the lateral movement of the moving track. Fig. 4 is a plan view showing a slightly modified arrangement and also showing the position occupied by the bridge when in bridging position with the two tracks considerably out of line. Fig. 5 is a detail view in section on the line A, A, Fig. 1 showing the means for connecting the bridge member with one of the track sections. Fig. 6 is a similar view on the line B, B, Fig. 1. Fig. 7 is a view similar to Fig. 1 showing a slight modification, the bridge member being shown in open position. Fig. 8 is a broken view in section on the line C, C, Fig. 7. Fig. 9, is a view similar to Fig. 4 showing a plan of the arrangement of Fig. 1.

The same part is designated by the same reference sign wherever it occurs throughout the several views.

In the use of monorail trolleys, it is often required that the trolley be run from a fixed track to a moving track or the reverse or from one moving track to another moving track. The moving track may be carried by an overhead bridge like a traveling crane bridge operating on overhead tracks, or by a gantry crane operating on ground or floor tracks, or by other means. In bringing the track ends together, in order to enable the trolley to pass from one to the other, it is essential that they should be in accurate relative location, so that the trolley can pass across safely and without objectionable shock. If the opposing tracks fail to register properly, as, for instance, if one of the tracks is out of level with the other, due to settlement or deflection of one or the other of said tracks or supports, or if the tracks are offset by reason of one of the tracks being carried too far or not quite far enough before stopping, or if the clearance space between the proximate ends of the track sections varies, there is danger of the trolley not passing safely from one track to the other.

The difference in level or vertical height is much more likely to occur with the moving track carried by a gantry frame than if

carried by a bridge running on rails carried by the same structure which carries the co-operating track, and this is also true of the end clearance, because there is more opportunity for deflection, settlement and imperfect alinement of the crane runway. In a moving track carried by a gantry crane the possibility of variation in end clearance due to settlement of foundations, deflections and other causes may be considerable. It is necessary however that sufficient clearance between the proximate ends of the track sections should be provided so that under no circumstances could the end of one track strike the proximate end of the other track if the one is to pass by the other. When such a clearance is allowed and the clearance is increased by deflection or settlement in the structure it might result in too great a gap between the proximate ends of the track sections for the trolley to pass over safely and smoothly.

Our present invention is designed to overcome these and other difficulties, and in carrying out the objects of our invention we allow a considerable clearance space between the proximate ends of the track sections. In the forms which we have selected to illustrate our invention, we employ track rails in the form of flanged I beams, the trolley being designed to run along the lower flanges of the beams. Our invention however is not to be limited or restricted in this respect, as other forms of tracks are also contemplated. In the drawings, 1, designates one track section, and 8 the other track. Both the tracks 1 and 8 are provided with end shoes 2 and 13, preferably of cast steel which form continuations of the track beams. Loosely pivoted to the end shoe 2 of one of the track sections is a bridge piece or member 4, which is capable of being rocked until its outer end rests on the projecting end of shoe 13 of the other track section 8.

Arranged on each track end are safety stops or buffers 9, which operate, when in normal position, to prevent a trolley running off the open end of either track, when not registered with the other track, through the bridge member. The buffers 9 are preferably constructed with heavy springs 10 to diminish the shock in case a trolley wheel should bump against either of them.

When the bridge member 4 is lowered into bridging and registering relation with track 8, the safety buffers, in accordance with our invention are automatically raised out of the way of the trolley truck wheels. In the particular form shown for accomplishing this we employ solenoids, indicated at 12. The buffers drop by gravity into their safety positions whenever the current flowing through the solenoids is shut off.

The bridge member 4 may be raised or lowered by any suitable means. We have shown a lever 5 for this purpose, see Figs. 2 and 3, which is connected by suitable links and levers 30, to the rocking bridge member 4. If desired, and in order to insure that a movable track may not be shifted while the bridge is in lowered position we propose to open the circuit of the motor which moves said track whenever the bridge is lowered. A simple arrangement for accomplishing this is shown as one example of operative connections for the purpose wherein the lever 5 is arranged to operate a switch 15 in the circuit of the motor 31 which moves the movable track. This switch is so arranged that when the lever 5 is rocked to lower the bridge member 4 the switch 15 is opened, thereby opening the circuit of motor 31, and consequently the lateral movement of the moving track 1 is prevented. Of course other specific forms of means for accomplishing this purpose would readily occur to skilled mechanics without departure from our invention.

It is apparent that if track 1, has been brought into correct location relative to track 8, bridge member 4 can be lowered until its outer end engages correctly with the shoe on the proximate end of track 8. Should the location of track 1, deviate within certain limits, either vertically, laterally or longitudinally from correct location, the bridge member can still be lowered into correct engagement with the end shoe of track 8, notwithstanding such deviation. Various arrangements for securing this correct engagement, in case of such deviation, may be employed. In one form shown in Figs. 1 and 5, the shoe 13, is provided with a cone shaped projection 14, which is received in an inverted, correspondingly shaped seat in the free end of the bridge member 4, when the latter is lowered into bridging relation, and the hinge of bridge member 4 is carried as at 17 by swinging links 18, 19, pivoted to the end shoe 2. In the arrangement shown in Figs. 4, 7 and 8, the end casting or shoe 32 is provided with a V-shaped projection 33, which is received in a correspondingly shaped seat in the bridge member 4. The hinge of the bridge member is also made sufficiently loose to permit of a desired range of flexibility of movement of the bridge member relative to track section 1. From this construction it will be seen that if the deviation of the tracks 1, 8, from correct relative position is lateral, as indicated in the plan view of Fig. 4, the inclined lateral face of the projection 14, or 33, as the case may be engaging the corresponding seat surface of the bridge member will correspondingly move the outer or free end of the bridge member laterally as it drops into position, when lowered, thereby insuring correct registration with the end shoe of the

track section 8, the looseness of the hinge of the bridge member permitting such movement of said member. Should the deviation of track position be longitudinal, that is, should there be a variation in the clearance space between the proximate ends of tracks 1 and 8, then it will be seen that with the construction shown in Figs. 1, 5, 6 and 9, the inclined face of the cone projection 14, engaging with the corresponding surface of the seat in the bridge member when the latter is lowered into bridging relation, will cause the bridge member to move endwise, thereby bringing its free end into correct endwise relation with respect to the shoe on the end of the track section 8. The looseness of the hinge of bridge member or the swinging of the links 18, 19, will permit this endwise movement of the bridge member. Any variance in the end clearance in this case, will appear as a variance in the length of gap between the ends of bridge member 4, and the shoe at the end of track section 1, see Fig. 9. With the V-shaped registering device shown in Figs. 4, 7 and 8, there will, of course, be no such endwise movement of the bridge member and consequently any variance of end clearance will appear as a variance in the length of the gap between the free end of the bridge member and the shoe at the end of track section 8, see Fig. 4. Should the deviation of track position be vertical, the bridge member, by reason of the looseness of its hinge, or its swinging hinge supports, will readily adjust itself to such deviation by assuming the necessary vertically inclined position.

In order to insure the withdrawal of the trolley wheel buffers 9 when the bridge member is in proper bridging relation but not unless and until said member reaches that relation, we provide means operated by the bridge member as it approaches its final seated position in bridging relation, to effect the withdrawal of the buffers. In the particular arrangement shown, to which, however, our invention is not to be limited or restricted, we provide a switch in the circuit of the solenoids 12 which is operated to close said circuit when the bridge member is lowered into position. In one form of switch device for the purpose, the cone shaped projection 14 is provided with a pin 7, see Figs. 1, 5 and 7, which is engaged by the bridge member when it attains its final bridging position, and which operates to close the switch 34, in the circuit of the two solenoids 12 carried respectively by or respectively associated with tracks 8 and 1, which operate to raise the spring buffers 9 so that the trolley wheels may pass freely under them. When the bridge member 4 is not pressing on pin 7, switch 34 will be held normally open by suitable retracting means, such, for example, as spring 105.

In order that the circuit of the solenoids 12 may be completed only when the track sections 1 and 8 are brought into opposite or nearly opposite relation to each other, one of said track sections as 8, for instance, has associated therewith short conductor sections indicated at 101, 102, Figs. 2 and 3, respectively constituting terminals of the solenoid circuit. The other track section carries current collectors or contacts 103, 104, adapted to be brought into contacting relation with respect to the conductors 101, 102, respectively, when the two track sections 1, 8, are brought opposite or nearly opposite to each other. The solenoid circuit includes these contacts or collectors 103, 104. This arrangement permits the relative movement of the track sections past each other and the completion of the solenoid circuit, whenever the track sections are brought opposite or nearly opposite each other as follows from the positive side of a convenient source of current to conductor 102, collector 104, to one solenoid coil 12, to collector 103, conductor 101, the other solenoid coil 12, through switch 34 to the negative side of the current source.

The pin 7 is so placed that the bridge must be practically in its fixed position before it sets upon the pin to close the switch 34 and raise the buffers 9. This is an important feature of our invention as serious results might follow if the bridge member could close the electric switch 34 and raise the buffers 9 before the bridge had reached a position to form a smooth continuous track.

To prevent objectionable jolt in case of the extreme limit of end clearance between the proximate ends of either track and the bridge member, which would cause a gap in the track surfaces, one end of the bridge member and the opposing end of the track on the casting are off set or staggered longitudinally of the track sections on opposite sides thereof. An example is shown at 35, 36, in the plan view of the drawing, Fig. 4, also in Fig. 9. This arrangement prevents two opposite wheels on a truck passing the gap in the track at the same time, and insures that diagonal wheels of the truck are supported at all times by solid track surfaces. Any one of the four wheels of a rigid four wheeled truck can pass over a gap without objectionable shock.

The operation of our invention in the specific embodiment thereof selected for illustration is as follows: The track sections 1, 8, are brought opposite to each other, or nearly so, thereby bringing contacts 103, 104, into contact with conductors 101, 102, then the operator pulls the lever 5 from the position shown in Fig. 2 to the position indicated in Fig. 3. This operation lowers the bridge member 4 which causes

the switch 34 to close by the bridge member bearing on the pin 7. The closing of the switch 34 energizes the solenoids 12 which raise the buffers 9 and the trolley is able to traverse from the one track to the other. The operation of the lever also opens the switch 15 controlling the circuit of the motor 31 which moves one of the tracks as 1 for instance, thereby preventing any travel of said track relative to track 8 while the bridge is in lowered position. When the bridge is raised by reversing the above movement of the lever, the circuit controlling the solenoids is opened by the spring or other retracting means 105 acting on switch 34, and the buffers gravitate to their normal safety position, and the circuit is again closed to the motor 31 for controlling the lateral movement of the moving track.

It will be seen that in our invention a simple and efficient transit device for trolleys from one track to another is provided and whereby a variable level or clearance space between the two tracks or a variation in lateral relative position thereof are taken care of so that a trolley may safely pass across without danger of jolting or dropping through too great a gap. Also so that a moving track can pass by a relatively fixed track without danger of colliding therewith laterally. It will also be understood that the lever 5 may be controlled from any suitable or convenient point, as for instance, the control cage of the traveling crane portion. It is to be understood that our invention is not to be restricted to the use of track sections which are traversed along straight tracks or in a straight line.

Having now set forth the object and nature of our invention and constructions embodying the principles thereof what we claim as new and useful and of our own invention is:

1. In a mounted track system, transversely movable track section and a stationary track section, said track sections adapted to be brought into proximity with each other, shoes extending from the proximate ends of the track sections, a bridge member movably connected to the end shoe of one of the track sections, means for centering the bridge member relatively to the end shoe of the other track section, and means for raising and lowering said bridge member out of and into bridging relation between said track sections.

2. In a monorail track system, a stationary and a transversely movable track section, a bridge member for connecting the proximate ends of said track sections, said bridge member movably mounted upon one of said track sections, means for centering said bridge member relative to the other said track sections and operating means for raising and lowering said bridge member into and out of connecting relation between the proximate ends of said track sections.

3. In a monorail track system, a stationary and a transversely movable track, shoes extending from the proximate ends of the said tracks, a bridge member pivotally mounted in the end shoe of one of the tracks, bridge member centering devices and means for raising and lowering said bridge member into and out of engaging relation with the proximate end of the other track and said centering devices.

4. In a monorail track system, a stationary and a transversely movable track having a clearance space between the proximate ends thereof when in approximate alinement, a bridging member movably mounted on one of said tracks, alining devices for said bridge member when in bridging relation, and means for moving said bridging member to bridge said clearance space.

5. In a monorail track system, relatively movable tracks, a bridge member secured to one of said tracks, safety buffers arranged at the ends of each track to prevent trolleys from running off the open ends of either track, means for raising and lowering the bridge member out of and into connecting relation with the proximate end of the adjacent track, and means for moving said safety buffers out of and into safety position.

6. In a monorail track system, track sections having a clearance space between the proximate ends thereof when in approximate alinement, a bridge member movably connected to one of said tracks, safety buffers arranged at the ends of each track, means for raising and lowering said bridge member, and means whereby the raising and lowering of the bridging member controls the operation of the safety buffers into and out of position for use.

7. In a monorail track system, track sections having a clearance space between the proximate ends thereof when brought into approximate alinement, one of said track sections being movable relative to the other, means for controlling the movement of the movable track, a bridge member loosely secured to one of said tracks, safety buffers arranged at the ends of said tracks, means for raising and lowering the buffers, out of and into safety position, means for raising and lowering said bridge member out of and into position to bridge said clearance space and means whereby when the bridge member is lowered into bridging relation the means for raising the safety buffers becomes operative, and means whereby the lowering of the bridge renders inoperative the means for moving the track.

8. In a monorail track system, a stationary and a transversely movable track section, a bridge member loosely connected to

one of said track sections, alining devices carried by the other of said track sections to be engaged by the bridge member when in bridging relation, and means for moving said bridge member into and out of bridging relation with respect to the proximate ends of said track sections when the latter are brought into approximate alinement.

9. In a monorail track system, a stationary and a transversely movable track section, a bridging member loosely mounted at one end to one of said sections, means carried by the other of said sections to receive and aline the free end of said bridge member when in position for use, and means for moving said bridge member into and out of position for use when said track sections are brought into approximate alinement.

10. In a monorail track system, a transversely movable and a stationary track section, a bridging member loosely connected at one end to one of said sections, centering means carried by the other of said sections to loosely receive and center the other end of said bridge member when it is in position for use as a bridge between the proximate ends of said sections, and means for moving said bridge member into and out of position for use.

11. In a monorail track system, a transversely movable and a stationary track section arranged to be brought into approximate alinement with each other and having a clearance space, when so alined, between their proximate ends, a bridge member for said space and movably engaging the proximate ends of both sections when brought into bridging relation and means for moving said member into and out of position to bridge said space.

12. In a monorail track system, track sections adapted to be brought into approximate alinement with each other, means for bridging the space between said sections when brought into alinement, a safety buffer for one of said track sections said buffer being normally in position for use to prevent a trolley passing off the open end of said section, means for raising said buffer out of position for use, said means rendered effective only when said bridge member is in position for use.

13. In a monorail track system, track sections arranged to be brought into approximate alinement with each other, and having a clearance space, when so alined, between their proximate ends, safety buffers for the end of each track section, a bridge member for said space and means for moving said buffers out of position for use, said means becoming operative only when said bridge member is brought into bridging relation.

14. In a monorail track system, track sections arranged to be brought into approximate alinement with each other, and having a clearance space, when so alined, between their proximate ends, safety buffers for the ends of said sections, a bridging member for said space, means for moving said bridge member into and out of bridging relation and means rendered effective when said bridge member is in position for use for moving said buffers out of position for use.

15. In a monorail track system, track sections, means for moving one of said track sections into and out of approximate alinement with the other section, means for bridging the space between the proximate ends of said sections when in approximate alinement, operating devices for said bridging means, and connections whereby when said bridging means are in position for use the movable track section moving means is made inoperative.

16. In a monorail track system, track sections, a motor for moving one of said track sections, a bridge member to bridge the space between said track sections when brought into approximate alinement with each other, means for moving said bridge member into and out of position for use, said means also controlling said motor.

17. In a monorail track system, a fixed track section and a movable track section, a motor for moving said movable track section, a bridge member pivotally connected to one of said track sections, a lever to rock said bridge member into and out of position to bridge the space between the proximate ends of said sections, a switch for said motor said switch arranged to be controlled by said lever.

18. In a monorail track system, track sections, adapted to be brought into approximate alinement with each other, a movable bridge member loosely connected to one of said sections and having a recess on the under side thereof, means for moving said member into position to bridge the space between the proximate ends of said sections when alined and means carried by the other of said sections to enter said recess, when said member is in bridging relation, to center the same in said position.

19. In a monorail track system, a transversely movable and a stationary track section, said track sections adapted to be brought into approximate alinement with each other, a movable bridge member loosely connected to one of said sections and having a tapered recess, a correspondingly tapered projection carried by the other section to enter said recess when said member is in bridging position, to center the same, and means for moving said member into and out of bridging relation.

20. In a monorail track system, track sections having a clearance space between the proximate ends thereof when brought into

alinement, a movable bridge member for said space carried by one of said sections, means for moving said bridge member into and out of bridging relation, a safety buffer for the end of one of said sections, electrical devices for raising the same out of position for use, and means operated by the bridge member, as it approaches bridging position, to close the circuit of said electrical devices.

21. In a monorail track system, a transversely movable and a stationary track section, having a clearance space between the proximate ends thereof when brought into alinement with each other, a movable bridge member for said space, said member being loosely connected to one of said sections, means carried by the proximate end of the adjacent track section to engage and center the free end of said bridge member, when in bridging relation, to form a continuation of the track system across said space.

22. In a monorail track system, a transversely movable and a stationary track section offset endwise from each other when brought into substantial alinement with each other, a movable bridge member loosely connected to said movable section to bridge the clearance space between the proximate ends of said sections, centering devices carried by the end of the stationary track section to engage and center said bridge member when in bridging relation, to form a continuation of the track system across said space, and means for moving said bridge member into and out of bridging relation.

23. In a monorail track system, track sections having a clearance space between the proximate ends thereof when brought into alinement with each other, safety buffers carried at the ends of said sections, electrical devices for moving said buffers out of position for use, a circuit therefor, a bridge member to bridge said clearance space, means for moving said member into and out of bridging position, and means operated by said member as it approaches bridging relation to close said circuit.

24. In a monorail track system, a track section, a safety buffer carried thereby and normally in position to form a stop for a trolley operating along said section, a relatively movable track section adapted to be brought into approximate alinement with said first mentioned track section and means effective only when said track sections are brought opposite each other to move said buffer out of position for use to permit a trolley to pass from one to the other of said track sections.

25. In a monorail track system, a track section, safety buffer carried thereby and normally in position to form a stop for a trolley operating along said section, a relatively movable track section adapted to be brought into approximate alinement with said first mentioned track section electrical devices for moving said buffer out of normal position to permit a trolley to pass from one to the other of said track sections, a circuit for said electrical devices and coöperating contacts respectively associated with said track sections and arranged in said circuit to control the same, whereby said circuit is completed between said contacts only when said track sections are opposite each other, or nearly so.

26. In a monorail track system, a transversely movable and a stationary track section, a bridge member to bridge the space between the proximate ends of said track sections when brought opposite each other, said bridge member being movably connected to said movable track section, and means carried by the said stationary track system and engaging said bridge member when the latter approaches bridging relation, to move the same to compensate for variance in proper relative locations of the track sections.

27. In a monorail track system, a transversely movable and a stationary track section having a clearance space between the proximate ends thereof when brought into alinement with each other, and a bridge member to bridge said space, said member being loosely engaged with the proximate ends of both track sections to accommodate variations in correct relative locations of the track sections.

28. In a monorail track system, track sections having a clearance space between the proximate ends thereof, when brought into alinement with each other, a bridge member movable into and out of position to bridge said space, the track surfaces of the proximate ends of said bridge member and track sections being off set or staggered on opposite sides thereof.

29. In a monorail track system, track sections having a clearance space between the proximate ends thereof, when brought into alinement with each other, a bridge member for said space, the gaps between the proximate ends of the bridge member and track sections being off set longitudinally of the track sections.

30. In a monorail track system, track sections having a clearance space between their proximate ends when brought into alinement with each other, a bridge member for said space, the gaps on opposite sides of said bridge member between one end of said bridge member and the proximate end of a track section being staggered.

31. In a monorail track system, track sections having a clearance space between their proximate ends when brought into alinement with each other, a bridge member loosely connected to one of said sections, and movable into position to bridge said space, means

to accommodate said bridge member to variations from correct relative locations of said track sections, the gaps on opposite sides of said bridge member, and between the end thereof and the proximate end of a track section being staggered.

32. On a monorail track system, track sections means for moving one of said track sections into and out of approximate alinement with the other section, means for bridging the space between the proximate ends of said sections when in approximate alinement, operating devices for said bridging means, a safety buffer for the open end of one of said track sections, and means for moving the bridging means into position for use, said means also serving to make inoperative the track section moving means, and to effect the withdrawal of the safety buffer.

33. In a monorail track system, track sections, a motor for moving one of said sections into and out of approximate alinement with the other, a bridging member for the space between the proximate ends of said sections, when brought into approximate alinement, means for moving said bridge member into and out of position for use, said means also operating to control the circuit of the motor to render the motor inoperative when the bridge member is in position for use, a safety buffer for the open end of one of said track sections and means operated by the bridge member when moved into position for use for withdrawing the safety buffer.

34. In a monorail track system, relatively movable track sections, a motor for moving one of said sections, a bridging member and a safety buffer, electrical devices for moving the buffer, said bridging member controlling the circuit of said electrical devices, and means for moving the bridge member, said means also controlling said motor.

In testimony whereof we have hereunto set our hands in the presence of the subscribing witnesses, on this 18th day of September A. D., 1913.

NORMAN WHICHELLO.
HARRY SAWYER.

Witnesses:
C. T. AKIN,
LETTIE M. LOSS.