

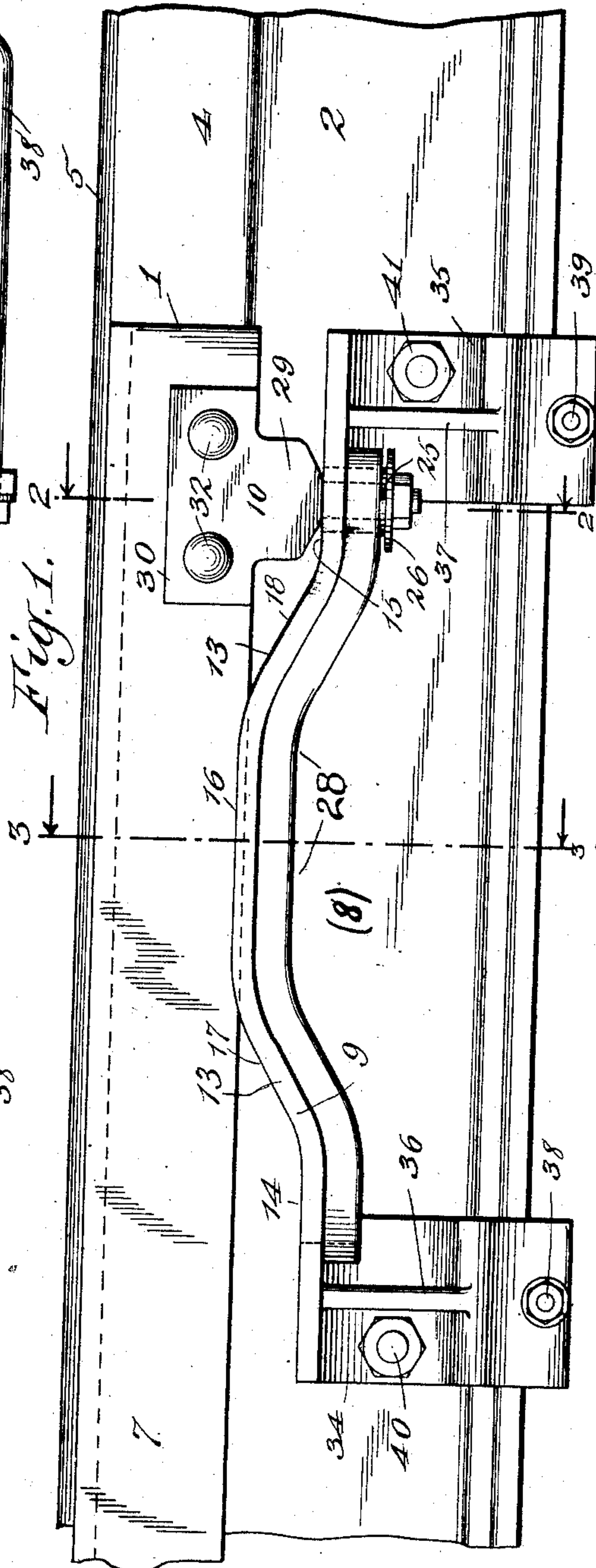
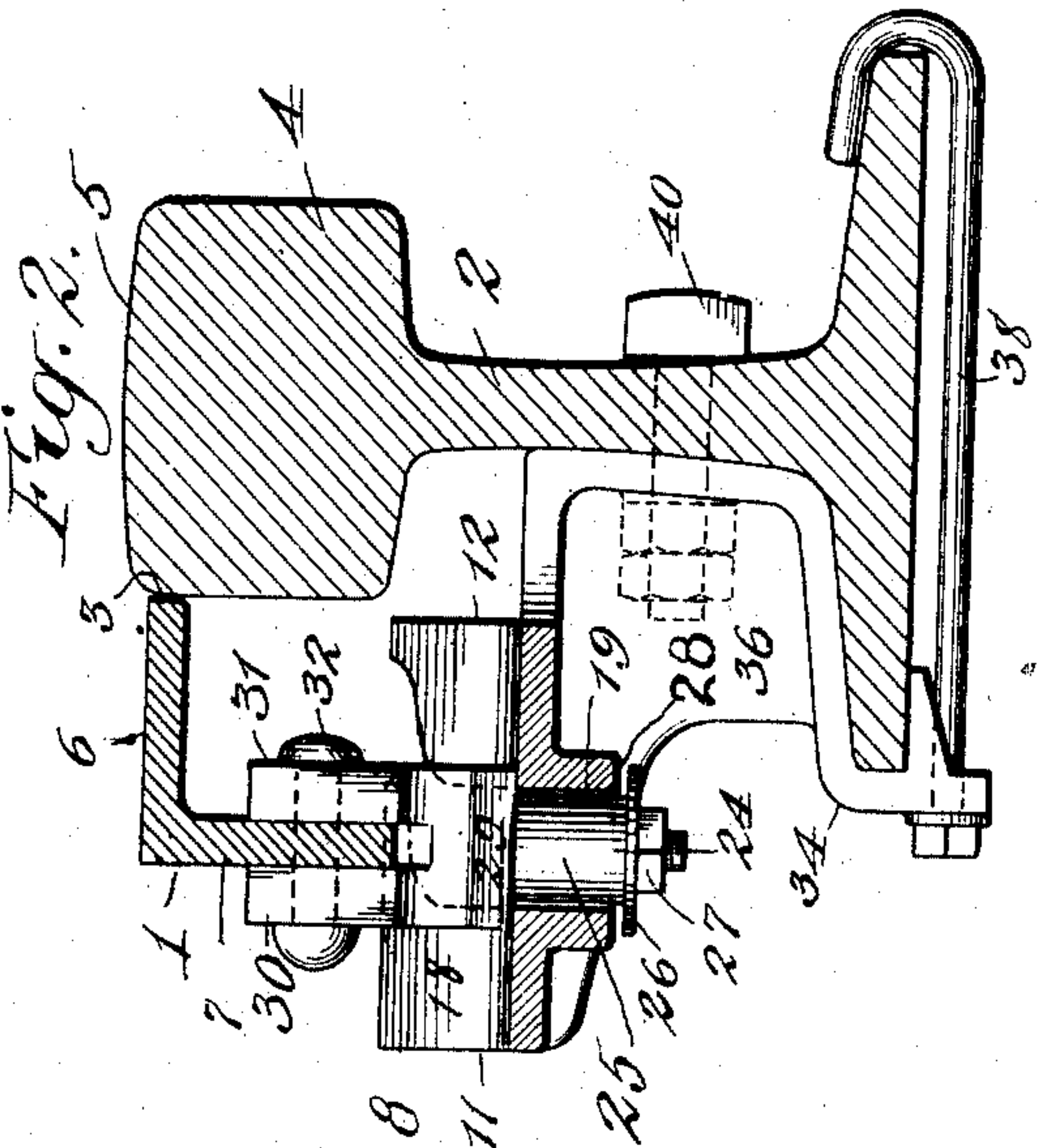
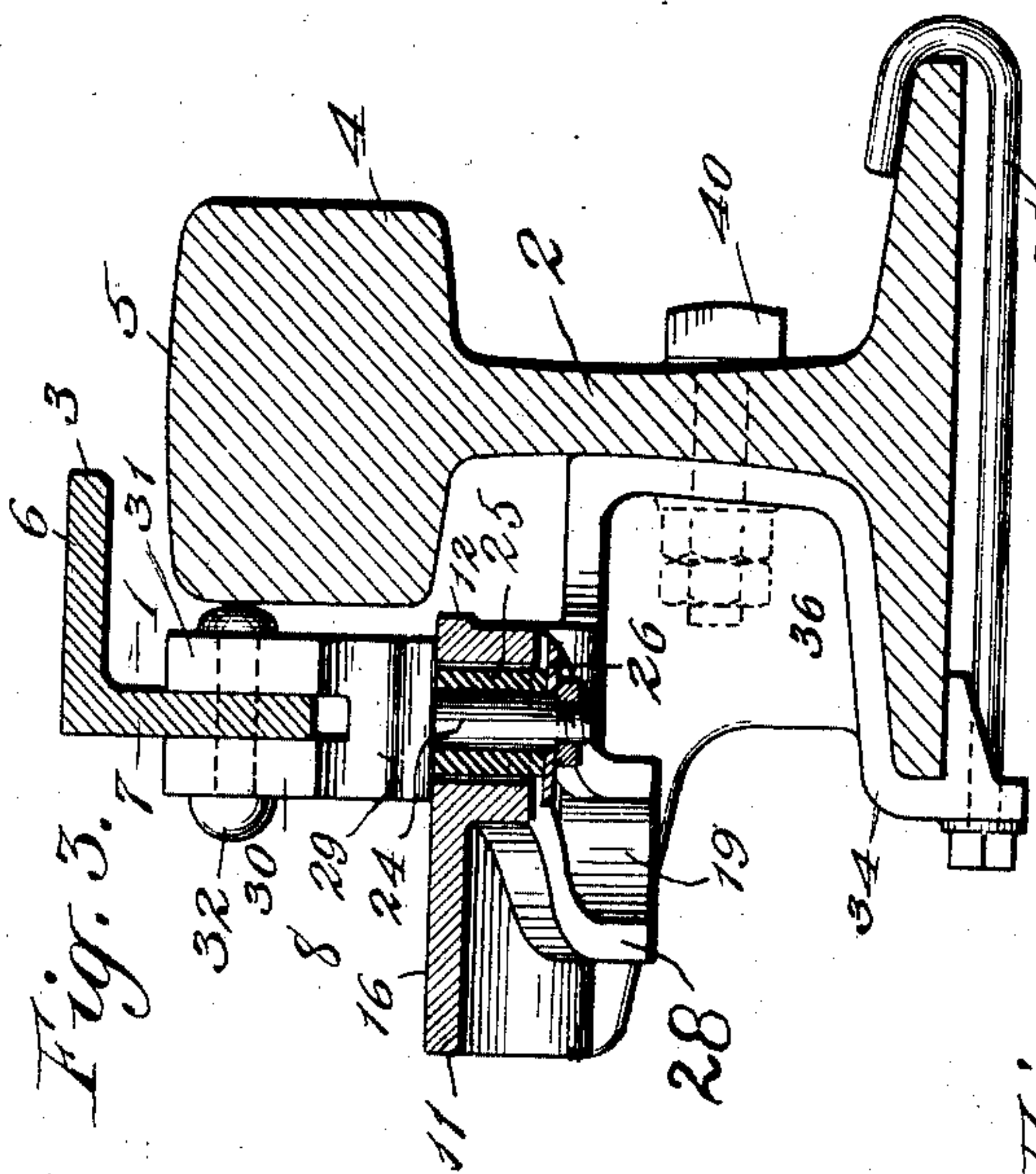
No. 874,196.

PATENTED DEC. 17, 1907.

C. HERRINGER.
DETECTOR BAR.

APPLICATION FILED AUG. 13, 1907.

2 SHEETS—SHEET 1.



WITNESSES:

Lionel Day
Ida C. Gilman.

INVENTOR.

Casper Herringer.
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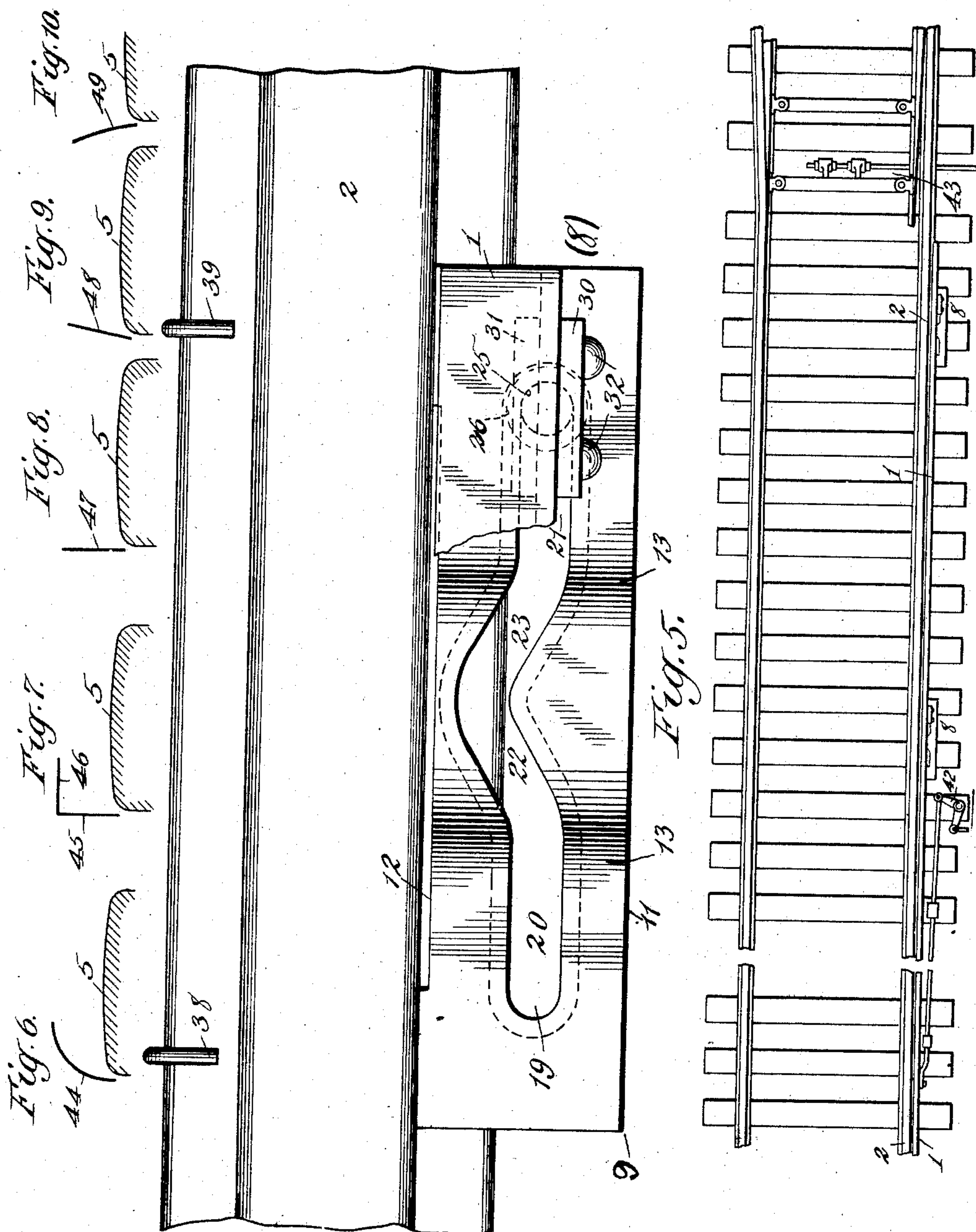
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2 SHEETS—SHEET 2.



WITNESSES:
Leonard Day
Ida G. Gilman

Fig. 4.

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UNITED STATES PATENT OFFICE.

CASPER HERRINGER, OF NEW YORK, N. Y., ASSIGNOR TO THE FEDERAL RAILWAY SIGNAL COMPANY, A CORPORATION OF NEW JERSEY.

DETECTOR-BAR.

No. 874,196.

Specification of Letters Patent.

Patented Dec. 17, 1907.

Application filed August 13, 1907. Serial No. 388,303.

To all whom it may concern:

Be it known that I, CASPER HERRINGER, a citizen of the United States, and a resident of the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Detector-Bars, of which the following is a specification.

This invention relates to detector bars for use on railways.

The invention seeks to provide a construction and arrangement more efficient and reliable than those heretofore in general use in the United States.

In the present invention, a new movement is given to the detector bar essentially different from the movement of the detector bars heretofore in use. By means of this new and different movement, the lack of reliability, which has been found to characterize detector bars heretofore used in this country, is effectually overcome.

Detector bars, according to practice in the United States, are located on the outside of the rail and are designed to move upwardly so as to engage the tread of the wheel which projects beyond the head of the rail. The efficiency and reliability of these detector bars is entirely dependent upon whether the tread of the wheel projects sufficiently beyond the head of the rail to squarely meet the upwardly rising detector bar and block it against a completion of its movement. It has been found in practice that not infrequently the tread of the wheels fails to thus sufficiently project beyond the rail head. This is due to various causes. Sometimes, because of careless or inaccurate construction, the rails are laid farther apart than the standard gage. Sometimes, the rails spread. This spreading of the rails is particularly noticed on curves and where the road bed is not properly maintained. Sometimes the car wheels have a comparatively narrow tread whereas the rail heads are extra wide. In consequence of the conditions stated, the tread of the car wheels not infrequently fails to block the movement of the detector bar. Again, it sometimes happens that, although the detector bar meets the tread of the wheel, it does so at its outer edge and because of the slippery condition of the contacting surfaces, due to grease or water, or because of the spring or play of the detector bar and its con-

nected parts, the detector bar slides up on the side of the wheel so as to pass by. This is more likely to happen when the movement of the train coincides with the longitudinal movement of the detector bar.

The defects above noted with reference to detector bars heretofore in use, are due to the fact that the wheel engaging edge of these bars has an up and down movement which is in a single plane. That is, so much of the movement of these bars as is transverse to the rail, whether this transverse movement be transverse with reference to the height of the rail or transverse with reference to the breadth of the rail or a combination of the two, that much of the movement is nevertheless in a single direction.

In the present invention, the wheel engaging edge of the detector bar has an upward and inward multi-direction movement transverse to the rail, that is to say, so much of the movement of the edge of said bar as is transverse to the rail is multi-directional and said movement is also inward as distinguished from outward. This upward and inward transverse movement of the edge of the bar must be in at least two directions and may be in any number of directions in excess of two. By reason of this multi-directional upward and inward movement a movement into two detecting positions may be accomplished and, if a detector bar fails to engage and be blocked by the tread of a wheel, it will nevertheless be engaged and blocked by the side face of the wheel, the movement toward engagement with the tread of the wheel and the movement toward the engagement with the side face of the wheel being both positive and intentional. Thus, it will be seen that the detector bar moves into two detecting positions. One position is against the tread of the wheel if the tread overhangs the head of the rail. The other position is against the side face of the wheel in case the tread of the wheel fails to overhang the head of the rail.

In its broader aspect the invention contemplates any means for effecting the upward and inward multi-directional movement, however constructed or arranged. The drawings show only one arrangement of means for effecting the desired movement, this being sufficient for the purpose of illustrating one of the many embodiments of

which the invention is susceptible. In the particular embodiment shown in the drawings, a cam way member which is stationary and a follower member which is secured to and moves with the detector bar are employed to effect the desired movement. Moreover, the camway member has two cam faces which operate in moving the bar from normal to detecting position and two reverse cam faces which operate in moving the bar from detecting position to normal position; and the follower member has one part which coöperates with two of said cam faces and another part which coöperates with the other two of said cam faces. However, as above stated, the invention is not limited, in its broader aspect, to these or any particular means for effecting the desired new movement of the detector bar; and this is true however the cam faces may be arranged, and whether there be a greater or less number of cam faces, and even though means other than cam faces be used to effect the desired movement.

Reference is to be had to the accompanying drawings which form part of this application, in which like numerals designate corresponding parts in the several figures, and in which,—

Figure 1 is a side elevation showing a detector bar and its guiding mechanism positioned on the outside of a rail with the detector bar in normal position; Fig. 2 is a transverse section through line 2—2 of Fig. 1, looking in the direction of the arrows; Fig. 3 is a transverse section through line 3—3 of Fig. 1 looking in the direction of the arrows and showing the detector bar in its extreme upward and inward position, its detecting position; Fig. 4 is a top plan view of the parts shown in Fig. 1 with a portion of the detector bar broken away; Fig. 5 is a plan view of a track and a track switch showing the installation of a detector bar and two sets of the guiding mechanism shown in Figs. 1, 2, 3 and 4; Fig. 6 is a diagrammatic representation of an upward and inward multi-direction transverse movement of the wheel engaging edge of applicant's detector bar relatively to the rail head when the multi-direction movement is that of a continuous curve; Fig. 7 is a similar diagram showing only two directions for the upward and inward multi-direction transverse movement; Fig. 8 is a similar diagram showing the single vertical direction of the transverse movement of a detector bar of the prior art; Fig. 9 is a similar diagram showing the single direction inclined vertical transverse movement of a detector bar of the prior art; and Fig. 10 is a similar diagram showing the outwardly curving direction of the transverse movement of still another detector bar of the prior art.

Referring now more in detail to the draw-

ings, 1 designates the detector bar lying outside of the rail 2 with its wheel engaging edge 3 preferably in close proximity to the side of the head 4 and slightly below the tread 5. The detector bar 1 may be of any well known construction but in a preferred form is that shown in the drawings, an angle bar comprising the flanges 6 and 7, the flange 6 lying horizontally and the flange 7 lying vertically.

Certain guiding means is provided for imparting an upward and inward multi-direction transverse movement to the edge 3 of the bar 1 relatively to the rail 2. This means for guiding is designated in its entirety in its present embodiment by the numeral 8 and may be best understood from Figs. 1 to 4 inclusive. In the embodiment shown in the drawings, this guiding means comprises two principal members, the camway member 9 and the follower member 10. The camway member 9 is illustrated in the form of a plate having parallel edges 11 and 12 and fixed in position relatively to the rail 2. The upper side of the camway member 9 forms a continuous cam face 13, comprising substantially horizontal longitudinally spaced portions 14 and 15, the elevated intermediate substantially horizontal portion 16 and the oppositely inclined intermediate portions 17 and 18, the portion 17 lying between the portions 14 and 16 and the portion 18 lying between the portions 15 and 16. The portion 17 is itself a cam face upwardly inclined to the length of the rail 2 while the portion 18 is a similarly inclined cam face, symmetrically located.

Extending through the camway member 9 is a continuous cam slot 19 which extends longitudinally substantially throughout the longitudinal extent of the cam face 13. As best shown in Fig. 4, the cam slot 19 comprises two longitudinally spaced portions 20 and 21 bounded by planes parallel to the length of the rail 2, and two intermediate oppositely inclined portions 22 and 23. It should be noted that, as illustrated, this continuous cam slot is substantially of the same width throughout its extent so that its side faces may coöperate properly as a camway with downwardly projecting parts 24, 25 of the follower member 10. It is preferred to provide the downwardly projecting part 24 with the anti-friction rotating bushing 25 as indicated in the drawings although it may be in the form of a solid projection if desired. The cam slot 19, just described, provides a convenient mode for the assembling of the follower member and the camway member. However in reality the principal functional elements of the slot are its side walls which constitute cam faces angularly disposed with respect to the cam faces 17 and 18 and the cam faces or ledges 14, 15 and 16. The expression "angularly disposed" means

that any element of the side walls of the cam slot 19 is at an angle to any element of the face 13. The side walls of the portions 22 and 23 of the cam slot 19 form cam faces to be engaged by the part 25 and which are inclined horizontally to the length of the rail 2.

The end of the part 24 projecting through the camway member 9 is provided with means illustrated in the form of a washer 26 held in place by a nut 27 which constitutes means for maintaining the follower member 10 in coöperative relation with the camway member 9 and prevents misplacement of the detector bar, as by preventing persons maliciously inclined from lifting the follower member and the camway member apart. The cam face 28 on the opposite side of the camway member 9 from the cam face 13 is provided so as to engage the washer 26 if gravity is insufficient to return the follower member to the position shown in Figs. 1 and 2 during its movement, which movement will hereinafter be explained. The follower member 10 is provided with a cradle like part 29 for engaging the cam face 13 and is best illustrated in Figs. 1, 2 and 3. Ears 30 and 31 are provided for the follower member 10 which may be secured to the detector bar by means of rivets 32 extending through these ears.

The camway member 9 may be secured in place by any suitable means, for example, it may be secured to the rail by one or more clips such as 34 and 35. If desired, the clips 34 and 35 may be cast integrally with the camway member 9, as indicated, each clip being provided with a strengthening rib, such as 36 and 37 respectively. The clips 34 and 35 may be secured to the rail either by the hook bolts 38 and 39 passing beneath the rails or by means of bolts 40 and 41 passing through the web of the rails or by both, as indicated in the drawings. It is also to be understood that under some conditions, it may be desirable to interchange the relative positions of the camway member and the follower member, in which case the follower member would be stationary. It is also to be understood that for some purposes the necessary cam faces need not be all assembled on a single camway member, that their number may be varied and that if all are assembled upon a single camway member that their number and disposition need not be that shown in the drawings.

Figs. 1 and 2 show the detector bar in its right hand normal position. If the detector bar is moved along to the left, it will be elevated and also be moved inwardly so that the flange 6 and the wheel engaging edge 3 will overlie the rail head 4.

In Fig. 5 two guiding means are shown in assembled relation to a detector bar 1 and a rail 2. A bell-crank mechanism 42 is connected, as shown, so as to effect a longitudi-

nal movement of the bar 1. The bell-crank mechanism may be interlocked in any well known manner with the switch 43 so that an unchecked movement of the detector bar 1 must be accomplished before the switch 43 may shift.

Figs. 1, 2 and 4 show the follower member 10 and detector bar 1 in normal position when the switch 43 is closed as shown in Fig. 4. The normal position for the follower member 10, if the switch 43 were open, would be in a position symmetrical to that shown in Fig. 2, etc. but at the left of the camway member 9. Fig. 3 shows the bar 1 in its extreme detecting position when, in the mechanism shown, the follower member 10 is midway between its normal positions described. In general practice before a track switch may be thrown, the detector bar must complete a movement from normal position to extreme detecting position and again to normal position. Depending upon the interlocking mechanism, this movement might, in the guiding means 8 illustrated, have a movement so that the follower member 10 moved from the right hand position as shown in Fig. 1 to the extreme left hand position allowed by the slot 19, or it might move to the mid position or extreme detecting position shown in Fig. 3 and back again to the right hand normal position shown in Fig. 1, in either case conforming in its movement to general requirements.

The operation of the guiding means 8 for a complete movement from the positions shown in Fig. 1 to the extreme left will now be described. The upwardly inclined cam face 13 engages the part 29 and causes an upward movement of the bar 1. Then the outer side wall of the portion 23 of the slot 19 acting as a cam face engages the outer side of the roller 25 causing an inward movement of the bar. Then the inner side face of the portion 22 of the slot 19 engages the inner side of the roller 25 causing an outward movement of the detector bar 1. Then the part 29 slides down the cam face 17 by gravity or is forced down by the underlying portion of the cam face 28 engaging the washer 26. A return movement from left to right is similar to the above and is obvious.

If the interlocking mechanism called for a movement up to extreme detecting position and back to the right hand position, the operation would be as follows: The part 29 engages the upwardly inclined cam face 18 and elevates the bar 1. The outer side wall of the slot portion 23, acting as a cam face, engages the outer face of roller 25, causing an inward movement of the bar 1. Then returning, the inner side wall of the slot portion 23, acting as a cam face on the inner face of the roller 25, causes an outward movement of the bar 1. Then the part 29 slides down the cam face 18 by gravity or is forced down

by the underneath cam face portion of the cam face 28.

In accomplishing the movement of the bar 1 from normal position to extreme detecting position, it is preferable that the upward movement of the edge 3 first prevail over the inward movement of said edge and that subsequently the inward movement of said edge prevail over the upward movement. The guiding means may be designed so that the edge 3 involves a curved surface shown in projection by the line 44 of Fig. 6; or first an upwardly extending surface, shown in projection by the line 45 and then an inwardly extending surface, shown in projection by the line 46, both of Fig. 7. Thus, when a train is present on the track and a movement of the detector bar is started, the edge 3 of the bar may be engaged directly against the tread of the wheel, if the tread extends out beyond the rail head 4. If however the wheel tread does not extend out beyond rail head 4, the edge 3 in its inward movement will be directed squarely against the side of the wheel, in either event giving a reliable detection by preventing the complete movement of the detector bar. By means of this multi-direction movement, it is possible to attain all the advantages of the old form of detector bar designed to engage the tread of the wheel and also to combine with them a reliable detection of the presence of a train by engaging the outside vertical face of a wheel in cases where old types of mechanism failed.

Fig. 8 shows the path 47 of the edge of an old type of detector bar which moves up in a single transverse direction, a vertical direction.

Fig. 9 shows the path 48 of the edge of another old type of bar moving up in a single transverse direction, and slightly inclined from the vertical.

Fig. 10 shows the path 49 of the edge of an old type of bar, which is pivoted off to one side and outside of the rail, the path being an outwardly curved arc.

Obviously with the paths shown in Figs. 8, 9 and 10, if the tread of the wheel did not extend outwardly beyond the rail head and detector bar, the wheel engaging edge, moving over any of the paths 47, 48 or 49 would not be stopped to detect the presence of a train.

Although a preferred embodiment of the invention has been illustrated and described, it is to be understood that modifications within the spirit and scope of the following claims are contemplated. Any guiding means which will produce an upward and inward multi-direction movement for the wheel engaging face of the detector bar is contemplated and not necessarily the form shown in the drawings. It is furthermore comprehended that a detector bar might operate in

a satisfactory manner if provided merely with an upward and inward multi-direction transverse movement alone, or, at the same time, have a longitudinal movement along the length of the rail in addition and as shown in the drawings. Furthermore, the number of cam faces employed may vary and the cam faces may be variously located and arranged, all being stationary or all moving or part stationary and part moving. Again, means other than cam faces may be substituted for some or all of the cam faces. The term "follower" as broadly used in this specification means a member or part which follows a cam face, whether the said member be a moving or a stationary part and if a moving part whatever may be the character of its movement.

What is claimed and what is desired to be secured by Letters Patent is:—

1. A detector bar designed and adapted to move into two detecting positions, one detecting position being against the tread of a wheel and another detecting position being against the side face of a wheel; and means for guiding the bar in said movement.

2. A detector bar designed and adapted to move into two detecting positions, one detecting position being against the tread of a wheel and another detecting position being against the side face of a wheel; and means for guiding the bar in said movement, said means for guiding comprising one or more cam faces and a part for operatively engaging each cam face.

3. A detector bar designed and adapted to move into two detecting positions, one detecting position being against the tread of a wheel and another detecting position being against the side face of a wheel; and means for guiding the bar in said movement, said means for guiding also permitting a longitudinal movement of said bar relative to the rail.

4. A detector bar designed and adapted to move into two detecting positions, one detecting position being against the tread of a wheel and another detecting position being against the side face of a wheel; and means for guiding the bar in said movement, said means for guiding comprising one or more cam faces and a part for operatively engaging each cam face and said means for guiding also permitting a longitudinal movement of said bar relative to the rail.

5. In combination, a detector bar for railway rails, said detector bar having transverse movement relative to the rail in the movement of said bar from normal to detecting position, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising means for imparting an upward movement to said edge and means

for imparting a subsequent inward movement to said edge, whereby said edge may be guided into two detecting positions.

6. In combination, a detector bar for railway rails, said detector bar having transverse movement relative to the rail in the movement of said bar from normal to detecting position, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding having one or more cam faces and a part for operatively engaging each cam face.

7. In combination, a detector bar for railway rails, said detector bar having transverse movement relative to the rail in the movement of said bar from normal to detecting position, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising means for imparting an upward movement to said edge and means for imparting a subsequent inward movement to said edge, one of said last two means embodying a cam face and a follower part.

8. In combination, a detector bar for railway rails, said detector bar having transverse movement relative to the rail in the movement of said bar from normal to detecting position, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising means for imparting an upward movement to said edge and means embodying a cam face and a follower part for imparting a subsequent inward movement to said edge.

9. In combination, a detector bar for railway rails, said detector bar having transverse movement relative to the rail in the movement of said bar from normal to detecting position, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding having two angularly disposed transverse acting cam faces and comprising a part for operatively engaging each cam face.

10. In combination, a detector bar for railway rails, said detector bar having transverse movement relative to the rail in the movement of said bar from normal to detecting position, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding having a cam face inclined from the

length of the rail to effect an upward movement of the detector bar, also having a second cam face inclined from the length of the rail and angularly disposed relatively to said first cam face to effect an inward movement of the detector bar, and a part for operatively engaging each of said cam faces.

11. In combination, a detector bar for railway rails, said detector bar having transverse movement relative to the rail in the movement of said bar from normal to detecting position, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding having a cam face inclined from the length of the rail to effect an upward movement of the detector bar, also having a second cam face inclined from the length of the rail and angularly disposed relatively to said first cam face to effect an inward movement of the detector bar, and a part for operatively engaging each of said cam faces, and a third cam face arranged and inclined oppositely to said second cam face and operative in returning said detector bar from detecting towards normal position.

12. In combination, a detector bar for railway rails, said detector bar having transverse movement relative to the rail in the movement of said bar from normal to detecting position, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding having a cam face inclined from the length of the rail to effect an upward movement of the detector bar, also having a second cam face inclined from the length of the rail and angularly disposed relatively to said first cam face to effect an inward movement of the detector bar, and a part for operatively engaging each of said cam faces, and two other cam faces corresponding to but oppositely located with respect to said first two cam faces and operative in returning said detector bar from detecting position to normal position.

13. In combination, a detector bar for railway rails, said detector bar having transverse movement relative to the rail in the movement of said bar from normal to detecting position, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising a camway member and a follower member one of which members is fixed in position and the other of which members is secured to the detector bar, said camway member having two angularly disposed

transverse acting cam faces and said follower member having parts for operatively engaging said cam faces respectively.

14. In combination, a detector bar for railway rails, said detector bar having transverse movement relative to the rail in the movement of said bar from normal to detecting position, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising a camway member fixed in position and a follower member secured to the detector bar, said camway member having two angularly disposed transverse acting cam faces and said follower member having parts for operatively engaging said cam faces respectively.

15. In combination, a detector bar for railway rails, said detector bar having transverse movement relative to the rail in the movement of said bar from normal to detecting position, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising a camway member fixed in position and a follower member secured to the detector bar, said camway member having an upwardly inclined top cam face and an inwardly inclined side cam face and said follower member having parts for operatively engaging said cam faces.

16. In combination, a detector bar for railway rails, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means for applying a longitudinal moving force to said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail.

17. In combination, a detector bar for railway rails, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means for applying a longitudinal moving force to said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising means for imparting an upward movement to said edge and means for imparting a subsequent inward movement to said edge.

18. In combination, a detector bar for railway rails, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal

to detecting position, means for applying a longitudinal moving force to said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding having one or more cam faces and a part for operatively engaging each said cam face.

19. In combination, a detector bar for railway rails, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means for applying a longitudinal moving force to said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising means for imparting an upward movement to said edge and means for imparting a subsequent inward movement to said edge, one of said last two means embodying a cam face and a follower part.

20. In combination, a detector bar for railway rails, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means for applying a longitudinal moving force to said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising means for imparting an upward movement to said edge and means embodying a cam face and a follower part for imparting a subsequent inward movement to said edge.

21. In combination, a detector bar for railway rails, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means for applying a longitudinal moving force to said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding having two angularly disposed transverse acting cam faces and comprising a part for operatively engaging each cam face.

22. In combination, a detector bar for railway rails, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means for applying a longitudinal moving force to said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for

guiding having a cam face inclined from the length of the rail to effect an upward movement of the detector bar, also having a second cam face inclined from the length of the rail and angularly disposed relatively to said first cam face to effect an inward movement of the detector bar, and a part for operatively engaging each of said cam faces.

23. In combination, a detector bar for railway rails, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means for applying a longitudinal moving force to the detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding having a cam face inclined from the length of the rail to effect an upward movement of the detector bar, also having a second cam face inclined from the length of the rail and angularly disposed relatively to said first cam face to effect an inward movement of the detector bar, and a part for operatively engaging each of said cam faces, and a third cam face arranged and inclined oppositely to said second cam face and operative in returning said detector bar from detecting towards normal position.

24. In combination, a detector bar for railway rails, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means for applying a longitudinal moving force to said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding having a cam face inclined from the length of the rail to effect an upward movement of the detector bar, also having a second cam face inclined from the length of the rail and angularly disposed relatively to said first cam face to effect an inward movement of the detector bar, and a part for operatively engaging each of said cam faces, and two other cam faces corresponding to but oppositely located with respect to said first two cam faces and operative in returning said detector bar from detecting position to normal position.

25. In combination, a detector bar for railway rails, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means for applying a longitudinal moving force to said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction move-

ment transverse to the rail, said means for guiding comprising a camway member and a follower member one of which members is secured to the detector bar, said camway member having two angularly disposed transverse acting cam faces and said follower member having parts for operatively engaging said cam faces respectively.

26. In combination, a detector bar for railway rails, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means for applying a longitudinal moving force to said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising a camway member fixed in position and a follower member secured to the detector bar, said camway member having two angularly disposed transverse acting cam faces and said follower member having parts for operatively engaging said cam faces respectively.

27. In combination, a detector bar for railway rails, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means for applying a longitudinal moving force to said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising a camway member fixed in position and a follower member having an upwardly inclined top cam face and an inwardly inclined side cam face and said follower member having parts for operatively engaging said cam faces.

28. In combination, a detector bar for railway rails, having an inwardly extending wheel engaging flange, said detector bar having transverse movement relative to the rail in the movement of said bar from normal to detecting position, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising means for imparting an upward movement to said edge and means for imparting a subsequent inward movement to said edge, whereby said edge may be guided into two detecting positions.

29. In combination, a detector bar for railway rails having an inwardly extending wheel engaging flange, said detector bar having transverse movement relative to the rail in the movement of said bar from normal to detecting position, and means for guiding said transverse movement so that the wheel

engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding having one or more cam faces and
5 a part for operatively engaging each cam face.

30. In combination, a detector bar for railway rails, having an inwardly extending wheel engaging flange, said detector bar having transverse movement relative to the rail
10 in the movement of said bar from normal to detecting position, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have
15 an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising means for imparting an upward movement to said edge and means for imparting a subsequent movement to
20 said edge, one of said last two means embodying a cam face and a follower part.

31. In combination, a detector bar for railway rails, having an inwardly extending wheel engaging flange, said detector bar having transverse movement relative to the rail
25 in the movement of said bar from normal to detecting position, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have
30 an upward and inward multi-direction movement transverse to the rail, said means for guiding having two angularly disposed transverse acting cam faces and comprising a part for operatively engaging each cam face.

32. In combination, a detector bar for railway rails having an inwardly extending wheel engaging flange, said detector bar having transverse movement relative to the rail
35 in the movement of said bar from normal to detecting position, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for
40 guiding having a cam face inclined from the length of the rail to effect an upward movement of the detector bar, also having a second cam face inclined from the length of the rail and angularly disposed relatively to said
45 first cam face to effect an inward movement of the detector bar, and a part for operatively engaging each of said cam faces, and a third cam face arranged and inclined oppositely to said second cam face and operative in returning said detector bar from detecting to-
50 wards normal position.

33. In combination, a detector bar for railway rails having an inwardly extending wheel engaging flange, said detector bar having transverse movement relative to the rail
55 in the movement of said bar from normal to detecting position, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have
60 an upward and inward multi-direction move-

ment transverse to the rail, said means for guiding comprising a camway member fixed in position and a follower member secured to the detector bar, said camway member having
70 two angularly disposed transverse acting cam faces and said follower member having parts for operatively engaging said cam faces respectively.

34. In combination, a detector bar for railway rails having an inwardly extending
75 wheel engaging flange, said detector bar having transverse movement relative to the rail in the movement of said bar from normal to detecting position, means for moving said detector bar, and means for guiding said
80 transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising means for imparting an
85 upward movement to said edge and means for imparting a subsequent inward movement to said edge, whereby said edge may be guided into two detecting positions.

35. In combination, a detector bar for railway rails having an inwardly extending
90 wheel engaging flange, said detector bar having transverse movement relative to the rail in the movement of said bar from normal to detecting position, means for moving said
95 detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding
100 comprising means for imparting an upward movement to said edge and means embodying a cam face and a follower part for imparting a subsequent inward movement to said edge.
105

36. In combination, a detector bar for railway rails having an inwardly extending wheel engaging flange, said detector bar having transverse movement relative to the rail
110 in the movement of said bar from normal to detecting position, means for moving said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction move-
115 ment transverse to the rail, said means for guiding comprising a camway member and a follower member one of which members is fixed in position and the other of which members is secured to the detector bar, said cam-
120 way member having two angularly disposed transverse acting cam faces and said follower member having parts for operatively engaging said cam faces respectively.

37. In combination, a detector bar for railway rails having an inwardly extending
125 wheel engaging flange, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means
130

for applying a longitudinal moving force to said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail.

38. In combination, a detector bar for railway rails having an inwardly extending wheel engaging flange, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means for applying a longitudinal moving force to said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising means for imparting an upward movement to said edge and means for imparting a subsequent inward movement to said edge, whereby said edge may be guided into two detecting positions.

39. In combination, a detector bar for railway rails having an inwardly extending wheel engaging flange, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means for applying a longitudinal moving force to said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding having one or more cam faces and a part for operatively engaging each cam face.

40. In combination, a detector bar for railway rails having an inwardly extending wheel engaging flange, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means for applying a longitudinal moving force to said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising means for imparting an upward movement to said edge and means for imparting a subsequent inward movement to said edge, one of said last two means embodying a cam face and a follower part.

41. In combination, a detector bar for railway rails having an inwardly extending wheel engaging flange, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means for applying a longitudinal moving force to said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction move-

ment transverse to the rail, said means for guiding comprising means for imparting an upward movement to said edge and means embodying a cam face and a follower part for imparting a subsequent inward movement to said edge.

42. In combination, a detector bar for railway rails having an inwardly extending wheel engaging flange, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means for applying a longitudinal moving force to said detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding having two angularly disposed transverse acting cam faces and comprising a part for operatively engaging each cam face.

43. In combination, a detector bar for railway rails having an inwardly extending wheel engaging flange, said detector bar having transverse and longitudinal movement relative to the rail in the movement of said bar from normal to detecting position, means for applying a longitudinal moving force to the detector bar, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding having a cam face inclined from the length of the rail to effect an upward movement of the detector bar, also having a second cam face inclined from the length of the rail and angularly disposed relatively to said first cam face to effect an inward movement of the detector bar, and a part for operatively engaging each of said cam faces, and a third cam face arranged and inclined oppositely to said second cam face and operative in returning said detector bar from detecting towards normal position.

44. A detector bar for railway rails, said detector bar having transverse movement relative to the rail, and means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising a camway member in the form of a plate having an inclined cam face and provided with a cam slot and said means also comprising a follower member cooperating with said cam face and said cam slot, one of said members being secured to the detector bar and the other of said members being fixed relatively to the rail.

45. A detector bar for railway rails, said detector bar having transverse movement relative to the rails, means for guiding said transverse movement so that the wheel en-

gaging edge of said detector shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising a camway member provided with a cam face inclined to the length of the rail and provided with a cam slot inclined to the length of the rail in a different direction from the incline of said cam face and said means also comprising a follower member, said follower member having faces for cooperating respectively with said cam face and said slot of the camway member, one of said members being secured to the detector bar and the other of said members being fixed relatively to the rail.

46. A detector bar in the form of an angle iron for railway rails, the faces of said angle iron being arranged respectively horizontally and vertically and said bar having transverse movement relative to the rail, means for holding said bar in normal position with its wheel engaging edge outside of the rail head and below the top surface thereof and for guiding the transverse movement of the bar so that the wheel engaging edge of said bar shall have an upward and inward multi-direction movement transverse to the rail from said normal position into extreme position overlying said rail head, whereby said edge may be guided into two detecting positions.

47. In a mechanism for detector bars, guiding means for imparting an inward transverse multi-direction movement to the detector bar relatively to the length of the railway rail, while permitting a simultaneous longitudinal movement of the detector bar.

48. In a mechanism for detector bars, guiding means for imparting an upward and inward transverse multi-direction movement to the detector bar relatively to the length of the railway rail, said means comprising a camway member, one or more clips for securing said camway member in position, said camway member being provided with a continuous top cam face, said face comprising two vertically and longitudinally spaced substantially horizontal portions and an intermediate inclined portion, said camway member also being provided with a continuous cam slot extending through the cam face, said cam slot having a portion extending between planes parallel to the length of the rail and a portion extending at an incline to said planes, and a follower member bearing upon said cam face and extending through said cam slot so as to cooperate with both said cam face and said cam slot, and means for securing a detector bar to said follower member.

49. In a mechanism for detector bars, guiding means for imparting an upward and inward transverse multi-direction movement to the detector bar relatively to the length of the railway rail, said means comprising a

camway member, one or more clips for securing said camway member in position, said camway member being provided with a continuous cam face, said face comprising two vertically and longitudinally spaced substantially horizontal portions and an intermediate inclined portion, said camway member also being provided with a continuous cam slot extending through the cam face, said cam slot having a portion extending between planes substantially parallel to the length of the rail and a portion extending at an incline to said first portion and a follower member bearing upon said cam face and extending through said cam slot so as to cooperate with both said cam face and said cam slot, and a detector bar having an overhanging horizontal wheel engaging portion secured to said follower member.

50. In a mechanism for detector bars, guiding means for imparting an upward and inward transverse multi-direction movement to the detector bar relatively to the length of the railway rail, said means comprising a camway member, clips for securing said camway member in position, said camway member being provided with a continuous top cam face, said face comprising two longitudinally spaced substantially horizontal portions, an intermediate elevated horizontal portion and two intermediate oppositely inclined portions each extending from a lower horizontal portion to the elevated horizontal portion, said camway member also being provided with a continuous cam slot extending through the cam face, said cam slot having two longitudinally spaced portions extending between planes substantially parallel to the length of the rail and two intermediate portions oppositely inclined relatively to said first two portions, and a follower member bearing upon said cam face and extending through said cam slot so as to cooperate with both said cam face and said cam slot, and means for securing a detector bar to said follower member.

51. In a mechanism for detector bars, guiding means for imparting an upward and inward transverse multi-direction movement to the detector bar relatively to the length of the railway rail, said means comprising a camway member, one or more clips for securing said camway member to the rail, said camway member being provided with a continuous top cam face, said face comprising two vertically and longitudinally spaced substantially horizontal portions and an intermediate inclined portion, said camway member also being provided with a continuous cam slot extending through the cam face, said cam slot having a portion extending between planes substantially parallel to the length of the rail and a portion extending at an incline to said first portion, and a follower member bearing upon said cam face and ex-

tending through said cam slot so as to coöperate with both said cam face and said cam slot, means for securing said follower member in coöperative relation with said camway member, and means for securing a detector bar to said follower member.

52. In a mechanism for detector bars, guiding means for imparting an upward and inward transverse multi-direction movement to the detector bar relatively to the length of the railway rail, said means comprising a camway member, clips for securing said camway member to the rail, said camway member being provided with a continuous top cam face, said face comprising two horizontally spaced substantially horizontal portions, an intermediate elevated horizontal portion and two intermediate oppositely inclined portions each extending from a lower horizontal portion to the elevated horizontal portion, said camway member also being provided with a continuous cam slot extending through said cam face, said cam slot having two longitudinally spaced portions extending between planes substantially parallel to the length of the rail and two intermediate portions oppositely inclined relatively to the said first two portions, and a follower member bearing upon said cam face and extending through said cam slot so as to coöperate with both said cam face and said cam slot, means for securing said follower member in coöperative relation with said camway member, and means for securing a detector bar to said follower member.

53. In a mechanism for detector bars, guiding means for imparting an upward and inward transverse multi-direction movement to the detector bar relatively to the length of the railway rail, said means comprising a camway member, one or more clips for securing said camway member to the rail, said camway member being provided with a continuous top cam face, said face comprising two vertically and longitudinally spaced substantially horizontal portions and an intermediate inclined portion, said camway member also being provided with a continuous cam slot extending through the cam face, said cam slot having a portion extending substantially parallel to the edges of said camway member and a portion extending at an incline to said edges, and a follower member bearing upon said cam face and extending through said cam slot so as to coöperate with both said cam face and said cam slot, said camway member being provided on its under side with a second cam face, a bridging washer secured to said follower member beneath said second cam face for retaining said follower member in coöperative relation with said camway member, and means for securing a detector bar to said follower member.

54. A detector bar designed and adapted

to move into two detecting positions, one detecting position being against the tread of a wheel and another detecting position being against the side face of a wheel; means for guiding the bar in said movement; and means for preventing displacement of the detector bar.

55. A detector bar designed and adapted to move into two detecting positions, one detecting position being against the tread of a wheel and another detecting position being against the side face of a wheel; means for guiding the bar in said movement, said means for guiding also permitting a longitudinal movement of said bar relative to the rail; and means for preventing displacement of the detector bar.

56. A detector bar designed and adapted to move into two detecting positions, one detecting position being against the tread of a wheel and another detecting position being against the side face of a wheel; means for guiding the bar in said movement, said means for guiding comprising one or more cam faces and a part for operatively engaging each cam face and said means for guiding also permitting a longitudinal movement of said bar relative to the rail; and means for preventing displacement of the detector bar.

57. In combination, a detector bar for railway rails, said detector bar having transverse movement relative to the rail in the movement of said bar from normal to detecting position, means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding comprising means for imparting an upward movement to said edge and means for imparting a subsequent inward movement to said edge; and means for preventing displacement of the detector bar.

58. In combination, a detector bar for railway rails, said detector bar having transverse movement relative to the rail in the movement of said bar from normal to detecting position, means for guiding said transverse movement so that the wheel engaging edge of said detector bar shall have an upward and inward multi-direction movement transverse to the rail, said means for guiding having one or more cam faces and a part for operatively engaging each cam face; and means for preventing displacement of the detector bar.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

CASPER HERRINGER.

Witnesses:

IDA G. GILMORE,
LEONARD DAY.