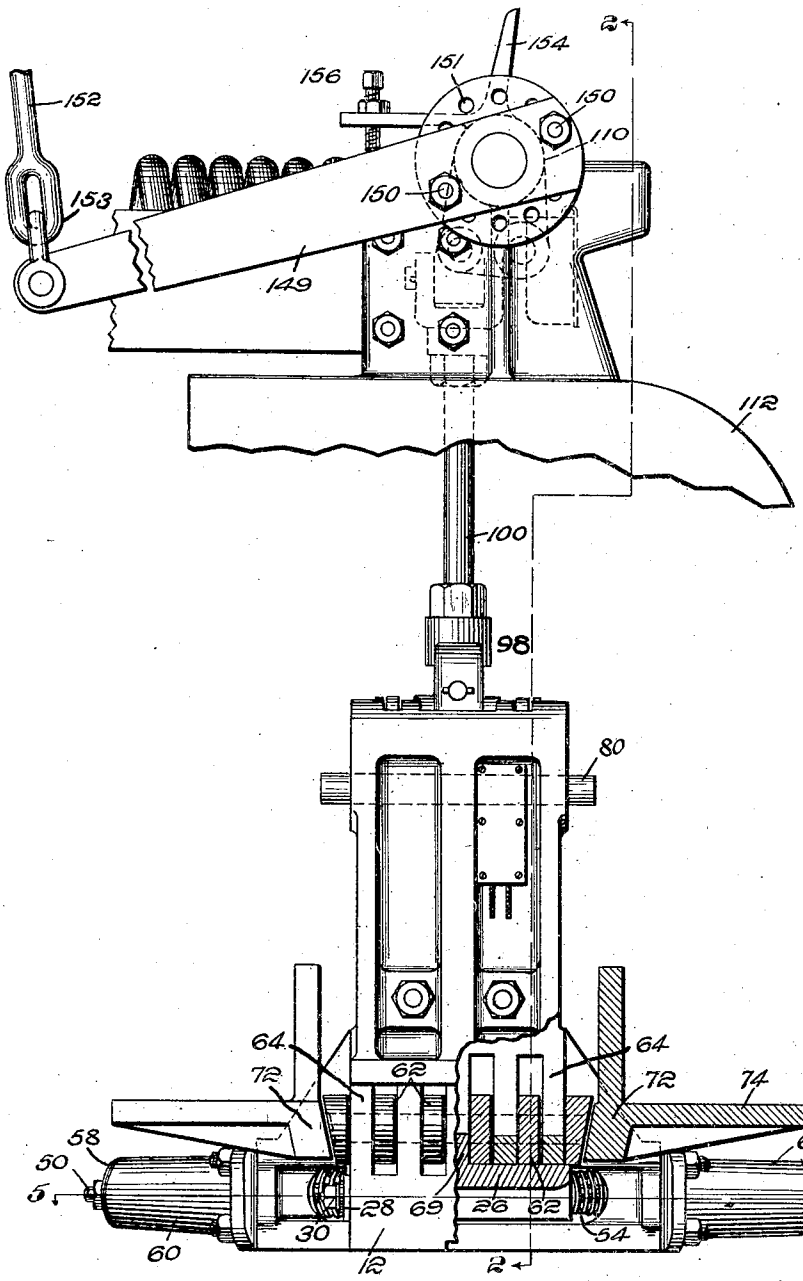
Oct. 11, 1927. 1,644,942

A. E. NORRIS

RAIL CLAMPING MECHANISM

Original Filed May 14, 1923 4 Sheets-Sheet 1

Fig. 1.



Inventor:
Almon E. Norris.
by Emery, Booth, Janney & Varney
Attys

Oct. 11, 1927. 1,644,942

A. E. NORRIS

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Original Filed May 14, 1923 4 Sheets-Sheet 2

Fig. 2.

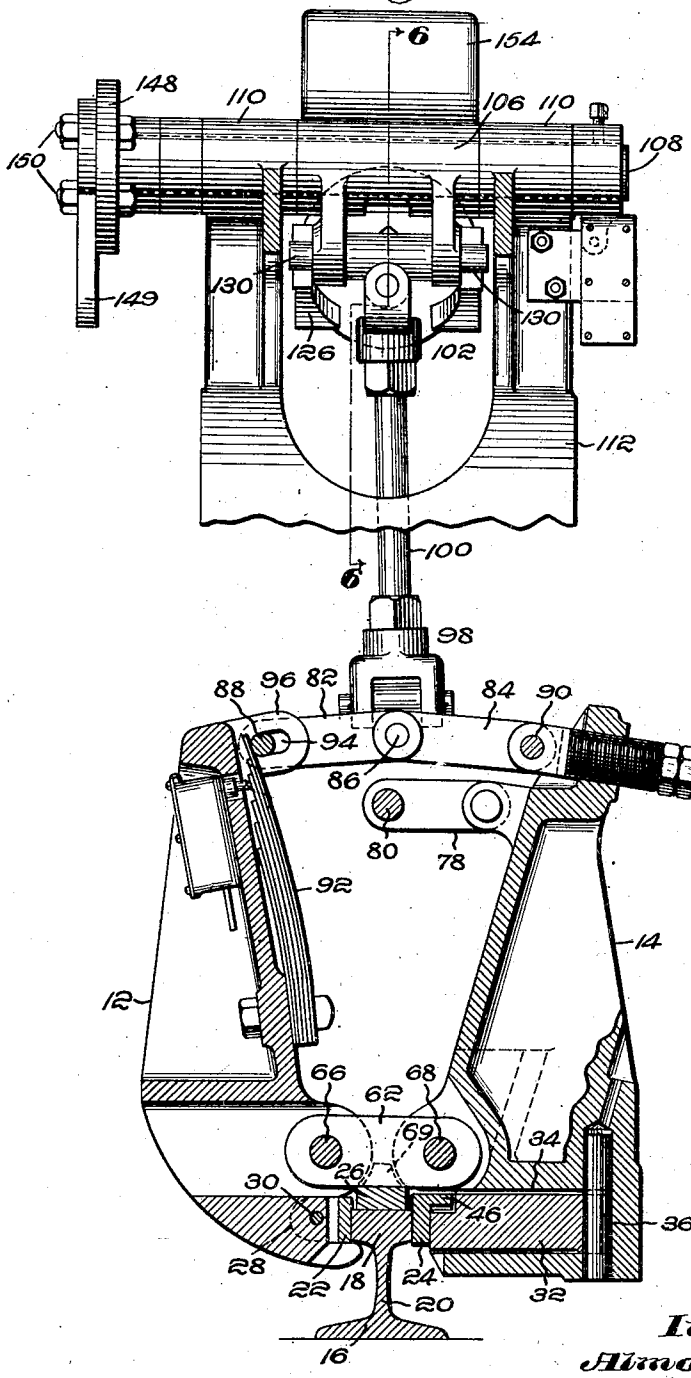
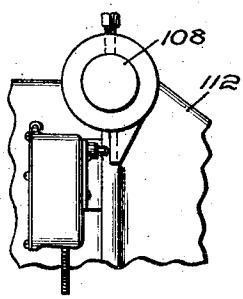


Fig. 3.



Inventor:
Almon E. Norris.
by Emery, Booth, Janney & Varney
Attys.

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A. E. NORRIS

RAIL CLAMPING MECHANISM

Original Filed May 14, 1923 4 Sheets-Sheet 3

Fig. 4.

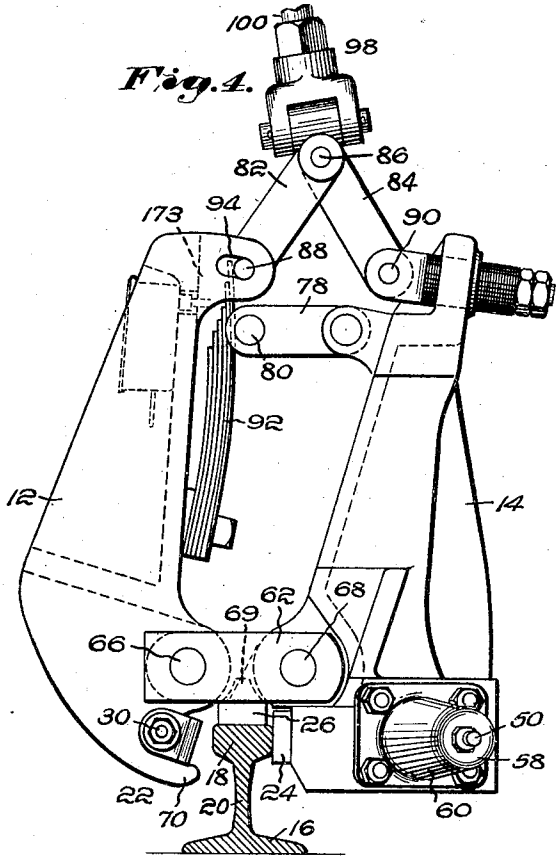
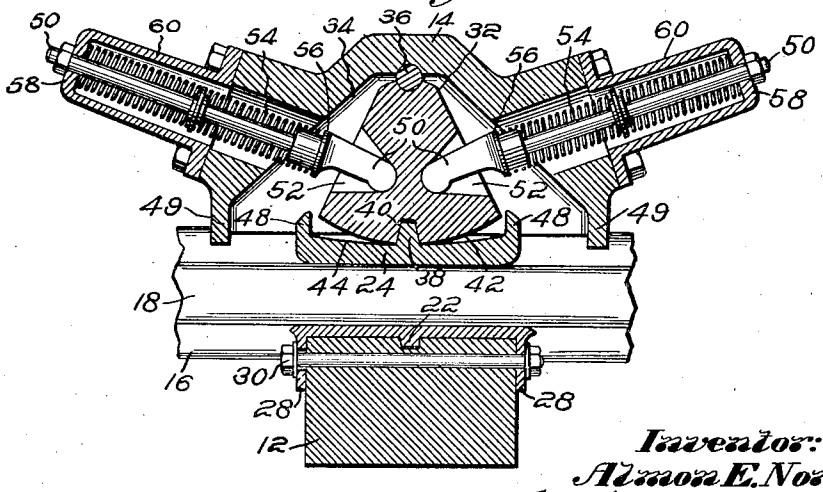


Fig. 5.



Inventor:
Almon E. Norris.
by Emery, Booth, Janney & Varney
Attys.

Oct. 11, 1927. 1,644,942

A. E. NORRIS

RAIL CLAMPING MECHANISM

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Fig. 6.

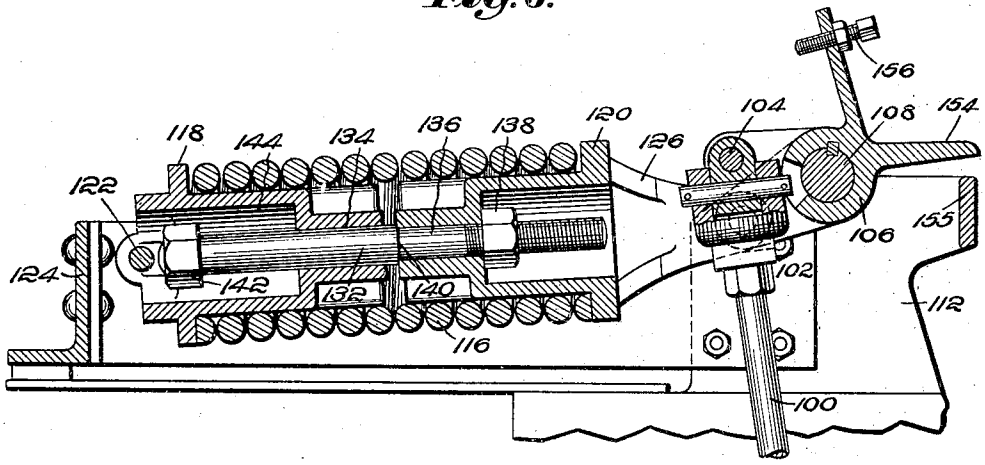
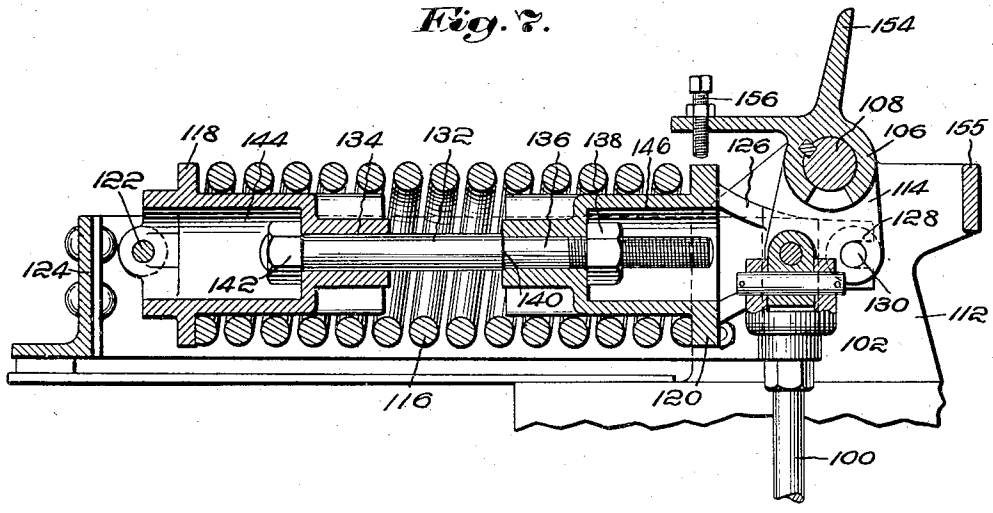


Fig. 7.



Inventor:
Almon E. Norris,
by Emery, Booth, Janney & Varney
Attys.

Patented Oct. 11, 1927. 1,644,942

UNITED STATES PATENT OFFICE.

ALMON E. NORRIS, OF BROOKLINE, MASSACHUSETTS.

RAIL-CLAMPING MECHANISM.

Original application filed May 14, 1923, Serial No. 638,789. Divided and this application filed November 4, 1924. Serial No. 747,875.

This invention relates to a novel and improved rail-clamping mechanism for conveying bridges, travelling cranes, and similar structures. The invention will be best understood by reference to the following description, when taken in connection with the accompanying drawings of one specific embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a side elevation, partly in vertical section, of a rail-clamping mechanism exemplifying the invention;

Fig. 2 is a sectional view on line 2—2 of Fig. 1;

Fig. 3 is a detail elevation of some of the parts shown in Fig. 2, as viewed from the right-hand side thereof;

Fig. 4 is a detail elevation of some of the parts shown in Fig. 2, viewed in the same direction, showing the clamp as it appears when open;

Fig. 5 is a sectional view on line 5—5 of Fig. 1; and

Figs. 6 and 7 are sectional views on line 6—6 of Fig. 2, Fig. 6 showing the parts in one position, and Fig. 7, in another position.

Referring to the drawings, and to the embodiment of the invention which is selected for purposes of exemplification, there is shown a rail-clamping mechanism comprising a pair of relatively movable jaws 12 and 14 (see Fig. 2), disposed on opposite sides, respectively, of a rail 16, herein of common form, having a head 18 and a web 20. Herein, the jaws are provided with shoes 22 and 24, which engage opposite sides, respectively, of the rail-head 18, while the shoe 26, which rests upon the top of the rail-head, affords support for the jaws. In the present example, the shoe 22 is adjustable to compensate for wear, as well as being renewable, and to that end, is provided with slotted ears 28 (see Fig. 5) to receive a bolt 30, which extends through the jaw 12 and secures the shoe thereto. The shoe 24, likewise, is renewable.

The clamping is accomplished by moving the jaws toward each other, thereby to bring the shoes firmly into contact with opposite sides, respectively, of the rail-head by mechanism presently to be described. Assuming the shoe 24 to be pressed against the rail, any tendency of the clamp to move lengthwise along the rail in either direction is utilized to cause the shoe to press against the rail with increasing force. To this end, the shoe is carried by a rocker, 32, which, as best shown in Fig. 5, is received in a recess 34 in the jaw 14, and is fulcrumed on a pin 36.

Suitable connection is made between the shoe and the rocker, whereby movement of one is accompanied by movement of the other, said shoe to this end being provided with a tooth 38 received in a notch 40 provided in the rocker. Herein, the rocker presents a working surface 42, which is concentric with its fulcrum, while the cooperating shoe 24 has a working surface 44, which is inclined in two directions with relation to the rail-engaging surface of the shoe,—that is to say, the shoe increases in thickness from its central portion towards its ends. This form causes rocking movement of the rocker in either direction from its central position to be accompanied by inward movement of the shoe toward the rail, while at the same time affording a much stronger construction of the shoe than has been possible heretofore in constructions employing shoes of uniform thickness.

The shoe 24 is provided with a flange 46 (see the lower portion of Fig. 2), by which it is supported on the rocker, and which serves the further purpose of excluding foreign matter, such as snow or ice, from the cooperating surfaces of the rocker and shoe. The shoe is also provided at its ends with projections 48 (see Fig. 5), which aid in the exclusion of foreign matter and serve as abutments cooperating with fixed stops 49 to limit lengthwise travel of said shoe.

The rocker is normally maintained in a central position by the engagement therewith of opposed plungers 50 received in recesses 52 provided in the sides of the rocker, and urged in generally opposite directions by springs 54 having their inner ends seated against abutments 56 on the plungers, and their outer ends against abutments 58 presented by caps 60, which are chambered to receive the springs and present guides for the plungers.

The jaws are connected to each other by one or more, herein a plurality of links 62, which, as shown in Fig. 1, alternate with ears 64 formed on the jaws. Rods 66 and 68, extending through the ears and links,

provide pivots for the latter. The ears 64 of the jaw 14 rest upon the top shoe 26, and the links 62 also rest upon the shoe, thus supporting the jaw 12. A lug 69 (see the lower portion of Fig. 1), formed on the central portion of the upper shoe and extending between two of the links, compels the shoe to travel with the jaws as the latter traverse the rail. Assuming that the shoe 22 is against the rail, and when the jaw 12 is swung from the position shown in Fig. 4 to the position shown in Fig. 2, when the shoe 22 brings up against the other side of the rail, an equal pressure is brought to bear on both sides of the rail.

The jaw 12 is provided with a lug 70, which projects beneath one side of the rail-head, and prevents the clamp from being lifted from the rail, should there be any lifting tendency of the truck (not shown) which carries the rail clamp. The movable jaws are mounted between fixed jaws or abutments 72 (see Fig. 1) presented by a frame 74. The confronting faces of the fixed jaws are bevelled as at 76, and the adjacent links 62 are correspondingly bevelled, thereby to prevent the fixed jaws and the frame of the truck to which they are attached from lifting to a greater extent than that which is determined by the underlying lug 70. This prevents the bridge or other structure from being lifted off the rail accidentally.

The jaw-actuating mechanism will now be described, reference being had at first more particularly to Fig. 2. The upper end of the jaw 14 is connected by a link 78 to a pivot 80 on the main frame 112, hereinafter mentioned, said link thereby preventing the upper part of the jaw from swinging laterally, while at the same time presenting a fulcrum about which the lower end of the jaw can swing. Relative swinging movement of the jaws is accomplished herein by the use of a toggle comprising one or more links 82, and one or more links 84, connected to each other by a pivot 86, and on the one hand to the jaw 12 by a pivot 88, and on the other hand to the jaw 14 by a pivot 90. When, therefore, the toggle is straightened from the position shown in Fig. 4 to the position shown in Fig. 2, the jaw 12 will be swung contraclockwise, and its shoe carried into gripping engagement with the rail.

In order that the jaw may be susceptible of a slight movement to compensate for variations in the width of the head of the rail and to insure proper engagement with the rail, there is provided yielding means interposed between the link 82 and the jaw 12, comprising a spring 92, which constantly tends to urge the pivot 88 toward the inner end of a slot 94 provided in ears 96 formed on the jaw 12. When, therefore, the shoe 22 brings up against the side of the rail-head and the toggle continues to straighten, the spring will yield and thereby furnish a yielding pressure of the shoe against the rail, this pressure finally becoming positive when the pivot 88 reaches the limit of movement defined by the slot 95.

The toggle actuating mechanism will now be described, reference being had at first to Fig. 2. The center pivot 86 of the toggle is connected by a universal joint 98 with a link 100, which in turn is connected by a universal joint 102, including a pivot 104, with a rocker 106 (see Figs. 6 and 7), which is keyed on a rockshaft 108, the latter as best shown in Fig. 2 being received in bearings 110 presented by a frame 112. Referring to the upper portion of Fig. 2, the rocker 106 presents two arms 114, between which the universal joint 102 is received, and through which the pivot 104 extends. The link 100 and the rocker 106 constitute a second toggle which straightens as the clamp-applying movement proceeds (see Figs. 6 and 7).

Movement of the rocker 106 in a clamp-applying direction (contraclockwise in Figs. 6 and 7) is accomplished by the use of a suitable spring, herein a helically coiled compression spring 116, whose ends rest against abutments 118 and 120, one of which is connected by a pivot 122 to a yoke 124, which constitutes a part of the frame, while the other abutment is bifurcated to present two jaws 126, which, as shown in Fig. 2, straddle the arms 114, and are notched as at 128 (see Fig. 7) to present bearings for a pivot 130, which extends through the arms 114, and pivotally connects the latter with the abutment, but in a manner readily to permit the pivot to be disconnected from the abutment, should occasion arise.

Herein, the two spring abutments are slidably connected, as by a rod 132 (see Figs. 6 and 7), which extends loosely through an opening 134 provided in the abutment 118, and is fixedly secured to the abutment 120, as by providing the latter with an opening 136, which receives a reduced portion of the rod, the latter being threaded to receive a nut 138, which clamps the abutment against a shoulder 140 presented by the rod. Relative separation under the influence of the spring may be limited by a nut 142, threaded onto the other end of the rod. Herein, the nuts 142 and 138 are received in chambers 144 and 146, presented by the abutments 118 and 120, respectively. The nut 142 plays to and fro in the chamber 144, accompanying expansion and contraction of the spring.

The rockshaft 108 (see Fig. 2) has keyed to it a flange 148, to which a lever 149 is adjustably secured, as by bolts 150 which extend through holes 151 provided in the flange, a sufficient number of holes being provided to permit the desired adjustment.

In this way, the angular position of the lever may be varied with respect to the toggle which it operates. To the other end of the lever an operating element, such as a rod 152, may be connected as by a shackle 153. In practice, the rod will lead to any convenient, remote point, such as the operator's station, which, in the case of a conveying bridge or travelling crane, is a cab placed in a central location in the upper horizontal part of the structure.

An upward pull on the rod 152 rocks the shaft 110 in a clockwise direction, as viewed in Fig. 1, from the position shown in Fig. 7, against the opposition presented by the spring 116, to some such position as that represented in Fig. 6. It is, of course, desirable that the rocking movement of the shaft shall not be so great as to carry the toggle presented by the rocker 106 and the parts 118, 120 and 132, into a straight line position; otherwise, the spring 116 would be ineffective to restore the parts to their initial position when the operating rod is released. To the end, then, that the over-travel of the rockshaft shall be prevented, there is herein provided a lug 154, conveniently formed integrally with the rocker 106, which is adapted to cooperate with a fixed stop 155, conveniently formed as an integral part of the frame 112, said stop being in the path of the lug, and preventing the descent of the latter beyond a proper predetermined limit. It should, of course, be understood that rocking movement of the shaft in the opposite direction is ordinarily limited by the thickness of the rail which is between the rail clamps, but in case there should be no rail between the rail clamps, rocking movement of the shaft contraclockwise as viewed in Fig. 7 is limited by a set screw 156 conveniently carried by the rocker 106, and adapted to cooperate with the upper portion of the abutment 120.

This application is a division of my pending application for rail-clamping mechanisms, filed May 14, 1923, Ser. No. 638,789.

Having thus described one embodiment of my invention, but without limiting myself thereto, what I claim and desire by Letters Patent to secure is:

1. In a rail clamping mechanism, the combination of a pair of clamps, a rocker carried by one of said clamps and presenting a working surface which is substantially concentric with its fulcrum, and a pair of rail-engaging shoes one of which has a surface which has rolling contact with said working surface and is inclined with reference to the rail.

2. In a rail clamping mechanism the combination of a pair of rail-engaging shoes, one of which increases in thickness from its central portion toward its ends, and a rocker presenting a working surface which is substantially concentric with its fulcrum and has rolling contact with such shoe.

3. In a rail clamping mechanism, the combination of a rail engaging shoe and a shoe-actuating rocker having toothed interengagement with each other and having cooperating working surfaces, one having rolling contact with the other, said working surface of said rocker being substantially concentric with its fulcrum, and said working surface of said shoe being inclined with relation to the rail-engaging surface of said shoe.

4. In a rail clamping mechanism, the combination of a rail clamp, a compress spring normally applying said clamp and furnishing the clamping force, and means to cause said spring as it lengthens to become increasingly effective to furnish increased clamping force as the applying movement of said clamp progresses.

5. In a rail clamping mechanism, the combination of a rail clamp adapted to engage the rail laterally, a clamp-applying, compression spring which furnishes the clamping force and which lengthens as the clamp-applying movement progresses, and means including a rocking arm connecting said spring to said rail clamp to compensate for the decreasing stress of said spring as it lengthens by increasing the mechanical advantage.

6. In a rail clamping mechanism, the combination of a rail clamp adapted to engage the rail laterally, a clamp-applying, compression spring which furnishes the clamping force by its expansive action and whose length increases as the clamp applying movement progresses, a rocking arm operated by said spring, and a toggle including two members connected to each other by a pivot toward which the thrust of said arm is exerted by the expansion of said spring, as said toggle straightens and compensates for the decreasing stress of said spring as it lengthens.

7. In a rail clamping mechanism, the combination of a rail clamp adapted to engage the rail laterally, a toggle including a clamp applying spring which furnishes the clamping force and whose stress lessens as the clamp applying movement progresses, and a second toggle to which the first toggle is connected and by which compensation is made for the decreasing stress of said spring by increasing the mechanical advantage.

8. In a rail-clamping mechanism, the combination of a pair of rail-clamping levers, a toggle comprising a pair of links pivotally connected to each other and to said levers, a toggle-actuating link having one end pivotally connected with said toggle, a rocker to which the other end of said toggle-actuating link is pivotally connected, an expansive link comprising two spring abutments one of which is pivotally connected with said

rocker, a support to which the other abutment is pivotally connected, and a clamp-applying spring interposed between said abutments.

9. In a rail-clamping mechanism, the combination of a pair of rail-clamping levers, a toggle comprising a pair of links pivotally connected to each other and to said levers, a toggle-actuating link having one end pivotally connected with said toggle, a rocker to which the other end of said toggle-actuating link is pivotally connected, an expansive link comprising a compression spring, two abutments for the ends of said spring, said abutments being slidably connected to each other and pivotally connected one to said rocker and the other to a fixed support.

10. In a rail clamping mechanism, the combination of a rail clamp adapted to engage the rail laterally, a rail clamp actuating rocker, an expansive link comprising a clamp applying spring which furnishes the clamping force, two spring abutments one of which is pivotally connected with said rocker, and a support to which the other abutment is pivotally connected, said link and said rocker constituting a toggle which straightens as the stress of said spring is removed from said rail clamp.

11. In a rail clamping mechanism, the combination of a rail clamp adapted to engage the rail laterally, a rail clamp actuating rocker, an expansive link comprising a clamp applying spring which furnishes the clamping force, two slidably connected spring abutments one of which is pivotally connected with said rocker, and a support to which the other abutment is pivotally connected, said link and said rocker constituting a toggle which straightens as the stress of said spring is removed from said rail clamp.

12. In a rail clamping mechanism, the combination of a rail clamp, a rail clamp actuating toggle including a clamp applying spring and an arm, and a link connecting the latter with said rail clamp.

13. In a rail clamping mechanism, the combination of a rail clamp, a rail clamp actuating toggle including an arm and a telescopic link, and a clamp applying spring which tends to expand said link.

14. In a rail clamping mechanism, the combination of a rail clamp, a rail-clamp actuating toggle including an arm, an expansive link and a pivot connecting said arm and said link, and a clamp applying spring which expands said link.

15. In a rail clamping mechanism, the combination of a rail clamp, a rail-clamp actuating toggle, including an arm, a link and a pivot connecting said arm and said link, and a clamp applying spring connected to said pivot and together with said arm constituting a second toggle.

16. In a rail clamping mechanism, the combination of a rail clamp, and two rail-clamp actuating toggles having an arm in common, one of said toggles including a clamp applying spring, and the second toggle including a link connecting the first toggle with said rail clamp.

17. In a rail clamping mechanism, the combination of a rail clamp, two rail-clamp actuating toggles one of which straightens and lengthens as the clamp applying movement progresses, and the other of which shortens as the clamp applying movement progresses and applies the clamp applying force to the first toggle, said toggles having an arm in common, and a third toggle which connects the first toggle to said rail clamp.

18. In a rail clamping mechanism, the combination of a rail clamp, a rail-clamp actuating rocker, a support for said rocker presenting a stop to limit the clamp releasing movement of said rocker, a stop for said rocker to limit clamp applying movement of said rocker, and a clamp applying spring connected to said rocker, the second mentioned stop presenting an abutment for said spring.

19. In a rail clamping mechanism, the combination of a rail clamp, a rail clamp actuating rocker, a support for said rocker presenting a stop to limit its clamp-releasing movement, and a clamp applying spring connected to said rocker.

20. In a rail clamping mechanism, the combination of a rail clamp, a rail-clamp actuating rocker, a support for said rocker presenting a stop to limit its clamp-releasing movement, a stop to limit the clamp-applying movement of said rocker, and a clamp applying spring connected to said rocker.

In testimony whereof, I have signed my name to this specification.

ALMON E. NORRIS.