Dec. 24, 1929. A. F. CASE 1,740,726

SAFETY STOP

Filed March 26, 1926 4 Sheets-Sheet 1

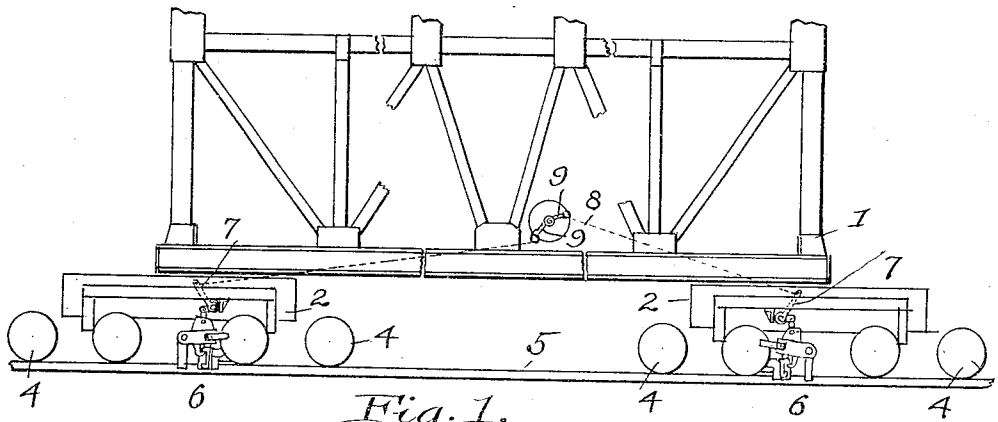


Fig. 1.

Fig. 7.

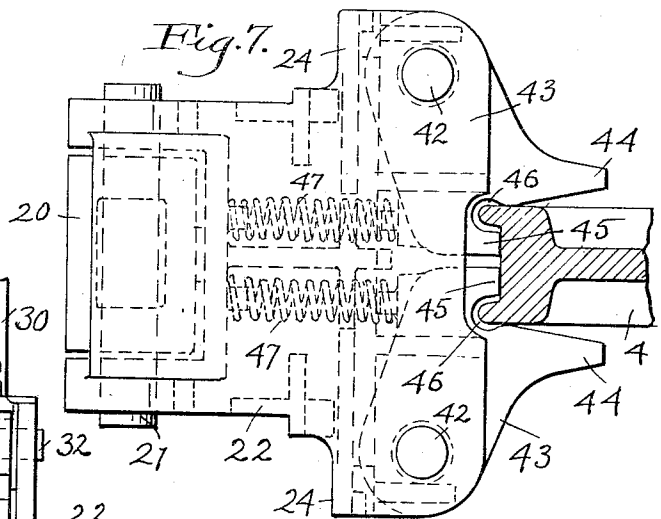
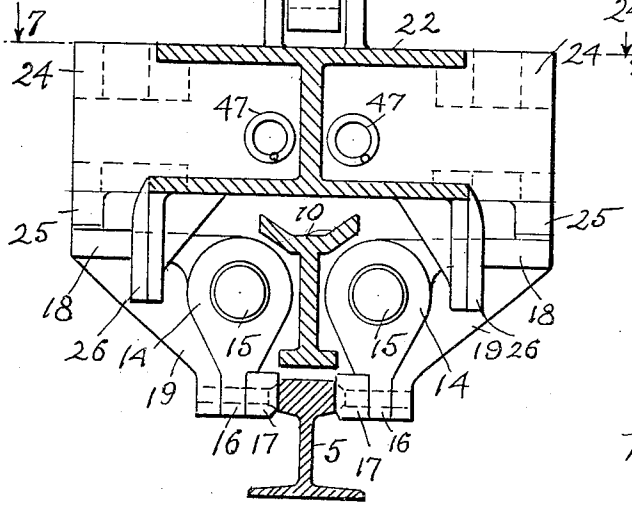


Fig. 6.



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Fig. 2.

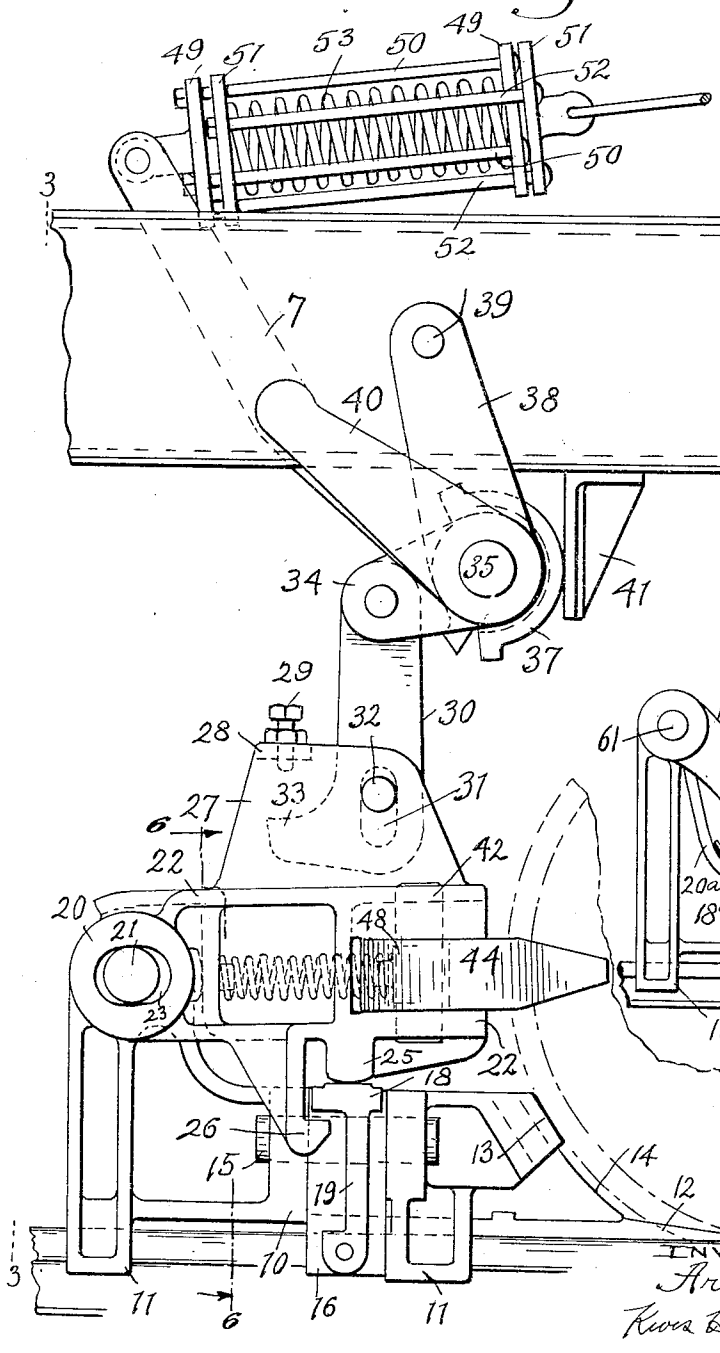
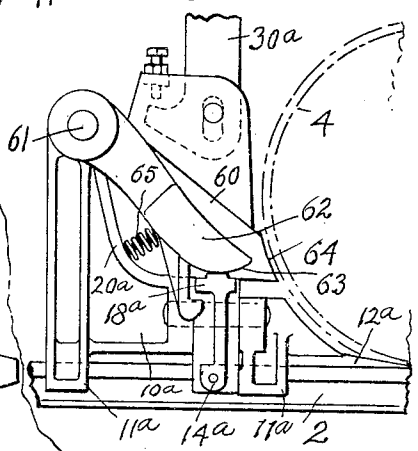


Fig. 9.



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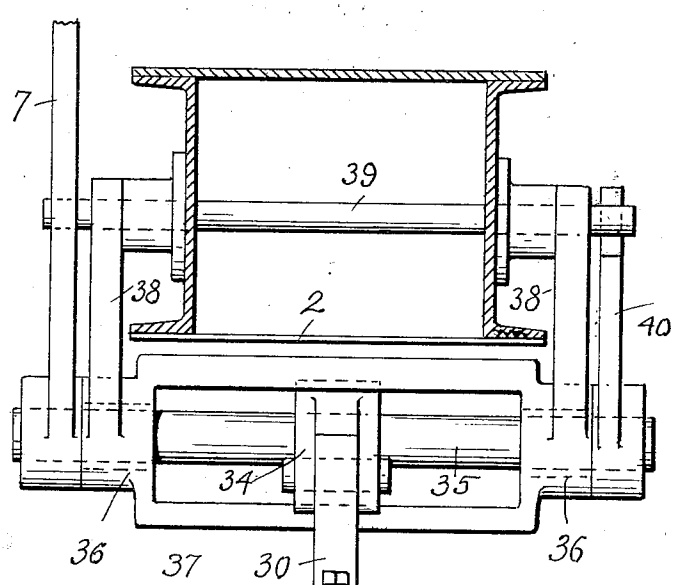


Fig. 3.

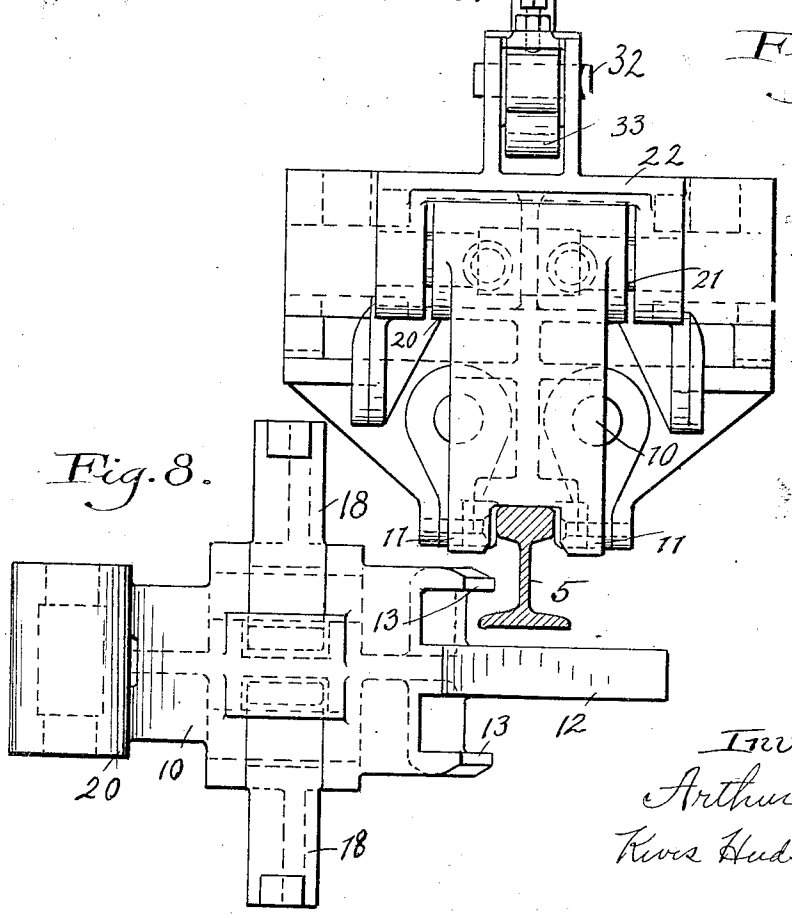


Fig. 8.

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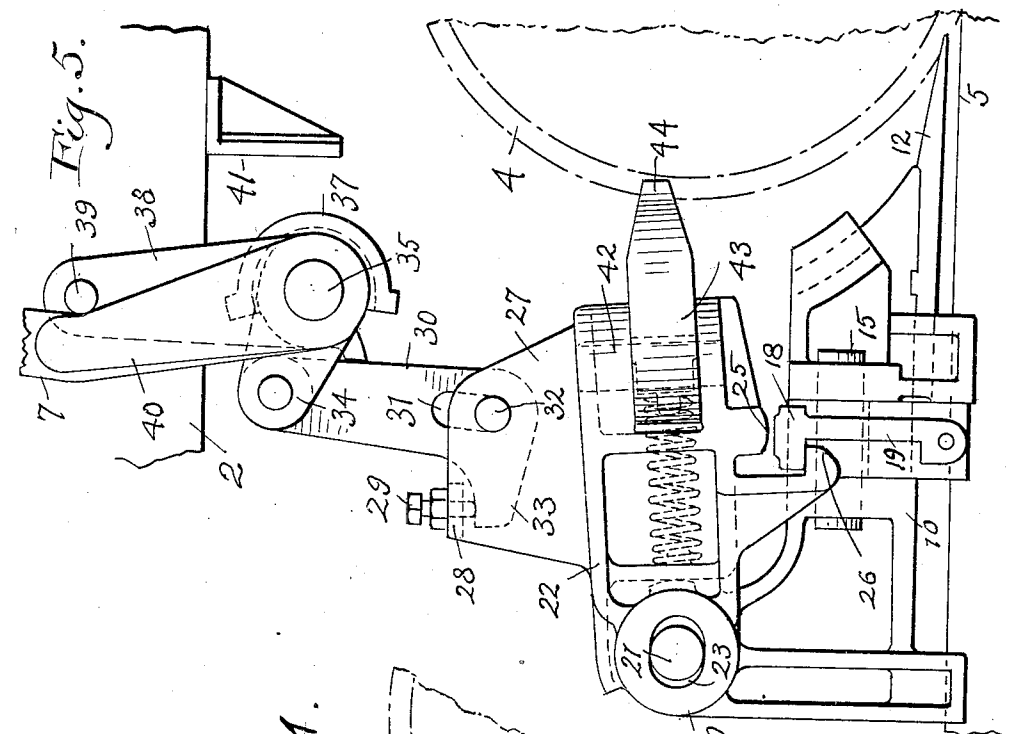


Fig. 5.

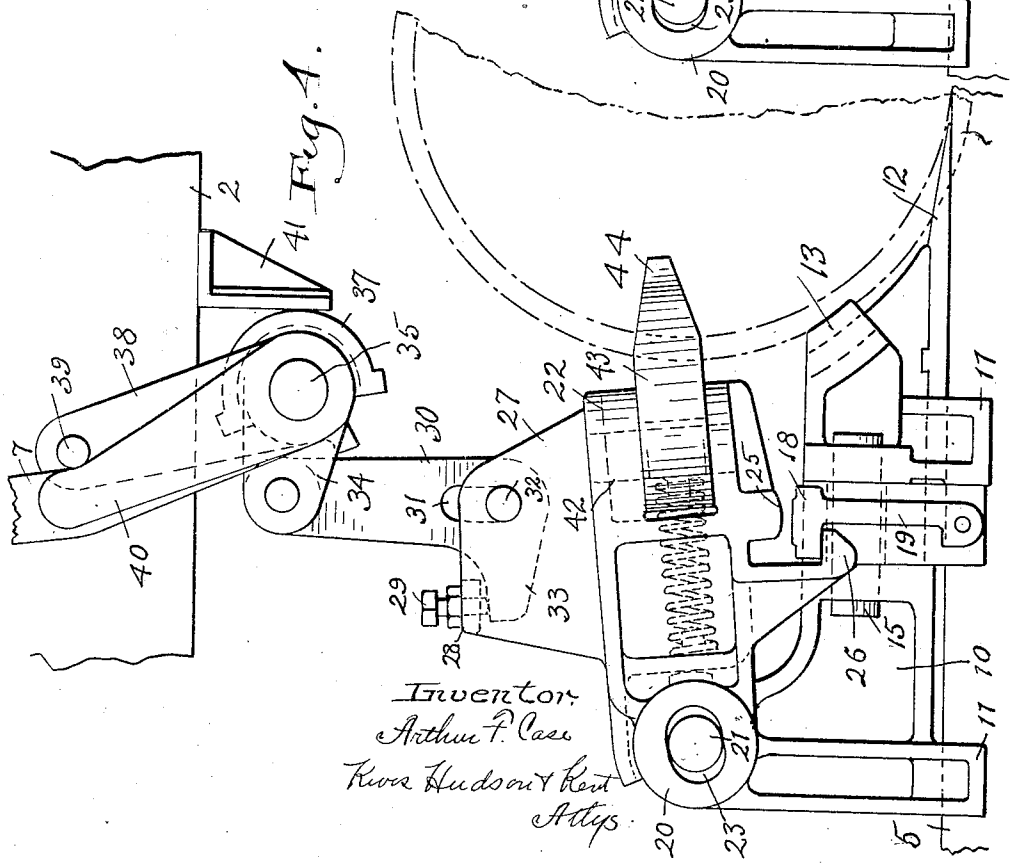


Fig. 4.

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Patented Dec. 24, 1929 1,740,726

UNITED STATES PATENT OFFICE

ARTHUR F. CASE, OF CLEVELAND, OHIO, ASSIGNOR TO THE WELLMAN-SEAVER-MORGAN COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO

SAFETY STOP

Application filed March 26, 1926. Serial No. 97,571.

This invention relates to safety stops for structures mounted to travel along a trackway and has particular reference to a safety stop for material conveying bridges for positively holding the bridge against travel along its trackway.

It is quite important that means be provided in connection with material conveying bridges for positively holding the bridge against movement away from any position in which the bridge is stopped along the length of its trackway so that the bridge will not be shifted from the position to which it is adjusted except when such movement is desired. A material conveying bridge has a large area exposed to wind pressure and a strong wind may exert an enormous pressure tending to move the bridge along its trackway. In view of the great weight of a bridge serious damage may be caused if the bridge should break away from its holding means.

Rail clamps have heretofore been provided for securing the bridge against movement on its track but, in so far as I am aware, all of these clamps have been held in gripping engagement with the rail by heavy actuating weights which have to be lifted in order to release the clamps and which consequently require operating motors capable of exerting sufficient power to lift the clamp actuating weights.

The present invention has for its object to provide an effective safety stop which does not require clamp operating counterweights and in which the operating mechanism is simplified and less power is required to operate.

A further object is to provide a safety stop having rail clamps which are operated by the pressure of the structure itself upon the stop.

A further object is to provide a wheel blocking member adapted to be positioned on the rail adjacent a wheel and provided with rail clamps adapted to be operated by the wheel.

With the above and other objects in view the invention may be said to comprise the device illustrated in the accompanying drawings hereinafter described and particularly set forth in the appended claims, together with such variations and modifications thereof as will be apparent to one skilled in the art to which the invention appertains.

Reference should be had to the accompanying drawings forming a part of this specification in which Fig. 1 is a fragmentary side elevation of a bridge showing a pair of oppositely positioned safety stops cooperating with one of the supporting rails and positioned in front of and in the rear of wheels of the bridge to restrain movement of the bridge in either direction; Fig. 2 is a side elevation of one of the wheel blocking members showing the blocking member in operative position on the rail; Fig. 3 is a section on line 3—3 of Fig. 2 showing a blocking member in rear elevation; Fig. 4 is a side elevation of the blocking member showing the blocking member and its actuating connections in a position in which the rail clamp has been shifted to open position preparatory to lifting the blocking member from the rail; Fig. 5 is a side elevation showing the blocking member in inoperative position; Fig. 6 is a section on line 6—6 of Fig. 2; Fig. 7 is a section on line 7—7 of Fig. 6 the webs 27 being omitted for the purpose of clearness; Fig. 8 is a top plan view of the wedge casting;

Fig. 9 is a side elevation showing a modified form of the invention.

Fig. 1 of the drawing shows a portion of the supporting leg at one end of the bridge, the portion of the bridge structure shown being designated generally by the numeral 1. The supporting leg of the bridge is supported on sills 2 which are mounted upon suitable trucks which have wheels 4 traveling upon a suitable railway track 5. Blocking members indicated generally by the reference numeral 6 are suspended from the bridge structure adjacent the front and rear ends thereof in such manner that they may be pressed into engagement with the track immediately in front of a wheel of the front truck and immediately to the rear of a wheel of a rear truck. The blocking members 6 are connected to suitable levers 7 on the supporting structure and the levers are adapted

to be simultaneously actuated to raise or lower the blocking members by means of connecting rods 8 extending to suitable cranks 9 on an operating shaft on the bridge structure. The cranks 9 may be actuated to lift and hold the blocking members in inactive position by the mechanism shown in my Patent No. 1,730,188, issued October 1, 1929.

Each of the wheel blocking members has a body in the form of a casting 10 which has a flat lower edge portion which is adapted to rest upon the tread of the track rail and which is provided with downwardly projecting flanges 11 which are adapted to straddle the rail adjacent the front and the rear ends of the body to maintain the body in proper alignment with the track rail. The casting 10 has at its forward end a wedge-shaped projection 12 which is of substantially the same width as the tread portion of the track rail and which has an inclined top surface upon which the wheel of the bridge runs when the bridge moves toward the blocking member. The body 10 is also provided at the forward end thereof on opposite sides of the projection 12 with guard flanges 13 which extend upon opposite sides of the wheel when the wheel is on the wedge to prevent displacement of the wheel. The body member 10 carries a pair of rail gripping members 14 which are connected to opposite sides of the body 10 by means of horizontal pivots 15. The gripping members 14 are substantially L-shaped and have clamping jaws 16 which hang downwardly from the pivots 15 and these clamping jaws are provided with rail engaging shoes 17 attached to the inner faces thereof. The members 14 are also provided with outwardly extending arms 18 which are connected with the jaws 16 by bracing ribs 19. The clamping jaws 16 are forced into gripping engagement with the rail by downward pressure exerted upon the outwardly extending arms 18 as will be presently explained.

At the rear end of each of the castings 10 there is an upwardly projecting bearing portion 20 in which there is mounted a horizontal transversely extending pivot pin 21 which projects beyond the opposite sides of the bearing portion 20. A lever 22 is provided with a rear end portion which straddles the bearing portion 20 of the casting 10 and which is provided with elongated openings 23 into which the projecting ends of the pin 21 extend, the lever 22 being adapted to swing vertically about the pivot pin 21 as an axis. The lever 22 extends forwardly from the bearing portion 20 and overlies the forward portion of the body 10, the lever being provided adjacent its forward end with laterally extending arms 24 which have projections 25 on the under side thereof which are adapted to bear upon the outer ends of the actuating arms 18 of the rail clamping members so that downward movement of the lever 22 forces the clamp 16 into engagement with the rail. The laterally extending arms 24 are also provided with hooks 26 which extend downwardly therefrom and underlie the arms 18 so that when the lever 22 is lifted the arm 18 will be swung upwardly and the jaws 16 will be swung outwardly away from the rail until the upper sides of the arms strike the abutments 25 of the lever whereupon further movement of the lever will lift the entire blocking unit. On the upper side thereof the lever 22 has spaced parallel upwardly extending webs 27 which are connected by a cross-bar 28 at their upper ends, the cross-bar 28 being provided with a set screw 29, the purpose of which will be presently explained. For the purpose of raising and lowering the lever 22 a link 30 has its lower end positioned between the webs 27 and provided with an elongated longitudinally extending slot 31 which receives a pivot pin 32 extending between the two webs 27. The lower end of the link 30 has a rearwardly projecting foot portion 33 which is adapted to engage with the lower end of the set screw 29 to limit the pivotal movement of the blocking unit with respect to the link 30 as the link 30 is lifted to raise the same. Upward movement of the link 30 first rocks the lever 22 about its pivot sufficiently to swing the jaws 16 out from the track rail as far as permitted by the hooks 26 and abutments 25 and then the foot portion 33 of the link is engaged by the adjustable abutment formed by the set screw 29 whereupon further upward movement of the link 30 will lift the casting 10 clear of the rail. The adjustment of the set screw 29 provides means for regulating the amount of pivotal movement of the blocking unit and by properly adjusting the set screw the blocking member may be supported in substantially horizontal position above the rail.

The upper end of the link 30 is connected to an arm 34 which is fixed to a shaft 35 which is journaled in a casting 36 which is pivotally suspended from the sill 2. The casting 36 has end portions in which the shaft 35 is journaled and intermediate these end portions is provided with a substantially semi-cylindrical guard portion 37 which extends around the shaft in the side opposite that toward which the arm 34 projects. At the opposite ends thereof the casting 36 is provided with integral arms 38 which extend upwardly and are pivotally connected to the projecting ends of a shaft 39 which extends through the sill 2. The shaft 35 projects beyond the outer ends of the casting 36 and to the inner end of this shaft the actuating lever 7 is fixed. To the outer end of the shaft 35 there is fixed a short arm 40 which extends upwardly parallel with the actuating lever 7. The pivot shaft 39 projects beyond the outer faces of

the arms 38 of the casting 36 which supports the shaft 35 and the projecting ends of the shaft 39 are in the path of movement of the lever 7 and the arm 40 which are fixed to the shaft 35. A stop bracket 41 is attached to the under side of the sill 2 somewhat in advance of the pivot shaft 39 and this stop bracket is engaged by the guard portion 37 of the casting 36 to limit the forward movement of the shaft 35. When the lever 7 is allowed to swing away from the shaft 39 to permit the wheel blocking member to be lowered onto the trackway, the casting 36 swings forwardly into engagement with the stop 41 as shown in Fig. 2. When a pull is exerted on the lever 7 in a direction to swing it toward the shaft 39 the shaft 35 is turned in its bearings, moving the arm 34 in an upwardly direction and lifting the link 30 which in turn swings the lever 22 about its pivot and lifts the arms 18 of the clamping members to free the jaws from the rail. When the lever 7 and arm 40 have been moved to a position in which they engage the pivot shaft 39, the lever 22 will have been lifted sufficiently to free the rail clamps and the foot portion 33 of the link 30 will have been brought into engagement with the stop 29 so that further upward movement of the link will cause the blocking member to be lifted bodily from the rail. Prior to the engagement of the lever 7 and arm 40 with the shaft 39, the fulcrum of the lever has been at the axis of the shaft 35 but, as soon as the lever 7 and arm 40 engage with the shaft 39, the shaft 39 becomes the fulcrum of the lever and further movement of the lever will swing the casting 36 bodily away from the stop 41 shifting the link 30 and the blocking members suspended therefrom bodily in a direction away from the wheel, there being at the same time an angular movement about the axis of the shaft 35 causing the blocking member to be elevated somewhat as it is being shifted away from the wheel. When the lever 7 is released the weight of the blocking member first swings the casting 36 forwardly into engagement with the stop 41 and then swings the lever away from the shaft 39 as the blocking member moves into engagement with the rail, the movement of the blocking member from inactive to operative position being first toward the wheel and then down into engagement with the rails so that the wedge projection 12 is inserted between the wheel and rail and a slight movement of the bridge toward the blocking member will cause the wheel 4 to run up upon the wedge portion 12 of the blocking member.

Adjacent the forward end of the lever 22 the laterally projecting arms 24 carry vertical pivot pins 42 upon which are pivoted a pair of wheel clamping jaws 43 which extend inwardly from the pivot pins 42. Each of the jaws is provided with a forwardly extending projection 44, the projection of one jaw lying upon the inner side of the wheel and the projection of the other jaw upon the outer side of the wheel. The inner faces of the projections 44 are tapered to permit the wheel to enter between the jaws and at the inner ends of the jaws there are projections 45 which are so positioned as to be engaged by the tread of the wheel as it moves along the wedge portion 12 of the blocking member, the projections 45 at the inner ends of the jaws 43 being separated from the projections 44 by recesses 46 which are adapted to receive the flanges of the wheel. The jaws 43 are normally held in open position by compression springs 47 which are interposed between the inner end portions of the jaws 43 and the rear end portion of the lever. The springs 47 serve to normally hold the jaws 43 in open position so that the wheel can enter between the jaws, the opening movement of the jaws 43 being limited by stop lugs 48 on the jaws which engage with portions of the arms 24 in which the jaws are mounted.

When it is desired to lock the bridge against travel along the trackway, the wheel blocking members are lowered into position upon the rails and when supported upon the rails the pin and slot connection between the lever 22 and the link 30 will permit the bridge to move in either direction with respect to any blocking member. When the bridge is moved by wind pressure or other propelling force, the wheels 4 adjacent the blocking members toward which the structure is moving, travels up upon the wedges 12 until the treads of the wheels come into engagement with the projections 45 of the wheel clamping jaws carried by the clamp actuating lever 22. The pressure of the wheels against the projections 45 swing the jaws 43 rearwardly about their pivot pins 42 compressing the springs 47 and pressing the projections 44 of the the jaws into engagement with opposite side faces of the wheel. It will be apparent that the gripping action of the jaws 43 upon the wheel will be proportional to the thrust of the wheel against the projections 45 of the jaws. The rotation of the wheels 4 gripped by the jaws 43 will exert a downward pressure on the forward end of the lever 22 and this downward pressure will be exerted through the projections 25 upon the actuating arms 18 of the rail clamp causing the rail gripping jaws to grip the rails with a pressure which is proportional to the thrust exerted by the wheels 4 upon the clamp actuating levers. The leverage between the wheels 4 and the wheel and rail clamping jaws will be such that the gripping action of the clamps will always be sufficient to prevent sliding of the blocking members on the track regardless of the propelling force applied to the bridge. Since the thrust of the bridge itself against the blocking members is utilized to set the holding clamps, the power required for shift-

ing the blocking members to inoperative position need be only sufficient to lift the blocking members out of engagement with the rail and it is therefore apparent that a much smaller motor can be employed than is required to shift heavy clamp applying weights, as has heretofore been necessary.

Since the wheels at one end of the supporting sills may be resting on the blocking wedges when it is desired to release the bridge, means is preferably provided whereby those blocking members which are free from the wheels may be lifted out of engagement with the rail and a lifting force may be applied to those blocking members which are locked to the rail by a wheel so that the latter blocking members will be automatically shifted to inoperative position as soon as the bridge has been propelled in a direction away from the blocking members sufficient to free the blocking members from the wheel. To this end each of the operating levers 7 has a spring connection with the connecting rod by which it is actuated. This spring connection is formed by two telescopically connected cages having a compression spring interposed between them, one of the cages being connected to the lever and the other to the connecting rod 8. The cage connected to the lever 7 consists of end plates 49 connected by tie rods 50 and the cage connected to the rod 8 consists of end plates 51 and tie rods 52. The tie rods 50 extend through the end plate 51 which is nearest the lever 7 and is slidably mounted on the tie rods between the plates 49. The tie rods 52 extend through the end plate 49 farthest from the lever 7 and slide in said plate and a compression spring 53 is interposed between the end plates 49 and 51 through which the tie rods slide. If a blocking member is held to the track by a wheel resting on the wedge 12, actuation of the crank 9 will put the spring 53 under compression and this spring, when the blocking member is released, has sufficient power to operate the lever 7 and swing the blocking member out of engagement with the track and wheel.

In Fig. 9 of the drawing there is shown a modification of the invention in which the body portion 10^a of the blocking member is provided with the aligning flanges 11^a, wedge shaped projection 12^a and rail gripping members 14^a having outwardly projecting actuating arms 18^a which are substantially the same as the corresponding parts in the modification first described. In this modification the rail gripping jaws are actuated by a lever 60 which is pivoted at 61 to the upstanding rear portion 20^a of the casting 10^a. The lever 60 extends forwardly and downwardly from the pivot 61 and has laterally extending cam arms 62 which have cam faces 63 on the undersides thereof which bear upon the arms 18^a of the rail gripping members adjacent the outer ends thereof. Adjacent the free end thereof the lever 60 has a curved face 64 which is in the path of movement of the tread of the wheel. As in the modification first described the top face of the wedge projection 12^a is at a small angle to the surface of the rail so that the wheel will roll up onto the wedge without pushing the wedge along the rail and after the wheel is on the wedge projection 12^a it will engage with the curved face 64 of the lever swinging the lever rearwardly about its pivot and exerting a downward pressure upon the outer ends of the arms 18^a through the cam faces 63 of the arms 62 clamping the blocking member to the rail with a gripping pressure proportional to the thrust exerted by the wheel on the lever. The blocking member above described may be released and lifted from the rail by the same mechanism shown in connection with the first modification, the lever 60 being connected to the lifting link in substantially the same manner. The lever arms 62 are also provided with hooks 26^a for swinging the clamping jaws out from the rail when the blocking member is lifted. The lever 60 is normally held in clamp releasing position by means of a spring 65 interposed between the casting 10^a and the underside of the lever, the arms 18^a in their upward movement engaging both the hooks 26^a and cams 63 to limit the movement of both the clamping jaws and actuating lever.

In both modifications of the present invention the rail gripping jaws and the actuating lever have a range of movement such that variations in the width of the rail will not prevent effective clamping action, the actuating lever acting to press the jaws against the rail with a force sufficient to prevent movement of the blocking member even though the portion of the rail engaged by the jaws be wider or narrower than the standard rail. The relatively wide range of movement of the clamping jaws is due to the fact that by utilizing the direct thrust of the traveling structure sufficient force can be applied to the gripping jaws through lever arms which are relatively short with respect to the jaws carried thereby and the jaws and lever arms can have greater angular movement.

Having thus described my invention, I claim:

1. The combination with a structure mounted to travel along a railway, of track engaging means connected with said structure, means carried by said structure for flexibly supporting said track engaging means and for lowering the same into track engaging position and lifting the same out of track engaging position, and means carried by the track engaging means responsive to a relative movement between said structure and track engaging means when the same is in engagement with the track for holding the structure against movement.

2. The combination with a structure mounted to travel along a railway, of blocking members carried by said structure and adapted to be moved into and out of engagement with a rail in advance of and in the rear of wheels of said structure, and means carrier by each blocking member and adapted when the blocking member engages the rail to be operated by a wheel for clamping the blocking member to the rail.

3. The combination with a structure mounted to travel along a railway, of blocking members connected with said structure and adapted to be placed on a rail in advance of and in the rear of wheels of said structure, each blocking member having a rail clamp and clamp operating means adapted to be engaged by the adjacent wheel.

4. The combination with a structure mounted to travel along a railway, of blocking members connected with said structure and adapted to be placed on a rail in advance of and in the rear of wheels of said structure, each blocking member having a rail clamp and clamp operating means adapted to be engaged by the adjacent wheel, and means carried by the structure for shifting the blocking members into and out of rail engaging position.

5. A safety stop for structures mounted to travel along a trackway comprising a wheel blocking member having mounted thereon movable track engaging means for holding the same against movement along the trackway, and means movably mounted on the blocking member and in the path of movement of a part of said structure for transmitting the thrust thereof to the holding means.

6. A safety stop for structures mounted to travel along a railway comprising a blocking member having a rail clamp mounted thereon, and means movably mounted on said member in the path of movement of a part of said structure and operatively connected with the clamp to set the same upon engagement of said part of the structure therewith.

7. A safety stop for structures mounted to travel along a railway comprising a wheel blocking member having a rail clamp mounted thereon, a thrust receiving member movably mounted on said blocking member in the path of movement of a part of said structure, said thrust receiving member being operatively connected to the clamp to cause the same to grip the rail.

8. A safety stop for structures mounted to travel upon a railway comprising a wheel blocking member adapted to be placed on a rail in the path of a wheel of said structure and having a pair of rail gripping jaws thereon, and jaw operating means carried by said member in the path of movement of the wheel for transmitting the thrust of a wheel to said jaws to press the same against the rail.

9. A safety stop for structures mounted to travel upon a railway comprising a wheel blocking member having a pair of rail gripping jaws thereon, a member movably mounted on the wheel blocking member for operating said jaws and adapted to be engaged by a wheel and to be shifted thereby in a direction to cause the jaws to grip the rail.

10. The combination with a structure mounted to travel along a railway track, of a blocking member adapted to be placed on the track and having a rail clamp thereon, and means responsive to a movement of the structure relatively to the blocking member for setting the clamp.

11. The combination with a structure mounted to travel along a railway track, of a blocking member adapted to be placed on the track and having a rail clamp, and clamp operating means movably mounted on the blocking member and adapted to be engaged and actuated by said structure upon movement thereof toward the blocking member.

12. A safety stop for structures mounted to travel along a railway comprising a wheel blocking member adapted to be placed upon a rail, rail gripping means carried by said blocking member, and means carried by the blocking member and adapted to be operated upon engagement of a wheel therewith to operate the rail gripping means to hold the blocking member against movement along the rail.

13. A safety stop for structures mounted to travel along a railway comprising a member adapted to be placed upon a rail, and wheel gripping means carried by said member and adapted to be automatically actuated to grip the wheel upon engagement of the wheel therewith.

14. A safety stop for structures mounted to travel along a railway comprising a holding member adapted to be placed upon a rail, wheel gripping means carried by said member and adapted to be actuated to grip a wheel of the structure, and means adapted to be operated by the wheel gripping means for holding said member against movement along the rail.

15. The combination with a structure mounted to travel along a railway, of a wheel blocking member, means carried by said structure for supporting said blocking member clear of the wheel and rail and for moving said blocking member into and out of blocking position, said means permitting relative movement between the structure and blocking member when the blocking member engages the rail, and means responsive to a relative movement between the structure and blocking member for clamping the blocking member to the rail.

16. The combination with a structure mounted to travel along a railway, of a wheel blocking member, means carried by said

structure for supporting said blocking member clear of the wheel and rail and for moving said blocking member into and out of blocking position, said means permitting relative movement between the structure and blocking member when the blocking member engages the rail, and means responsive to a relative movement between the structure and blocking member for clamping the blocking member to the rail and to the wheel.

17. A safety stop for structures adapted to travel along a railway comprising a member adapted to be placed upon a rail and means carried by said member and operable by the wheel upon engagement of the wheel therewith for clamping the same to the wheel and to the rail.

18. A safety stop for structures mounted to travel along a railway comprising a holding member adapted to be placed upon a rail, wheel gripping means carried by said member and adapted to be actuated to grip a wheel, and means adapted to be operated by said wheel gripping means for clamping said member to the rail.

19. A safety stop for structures adapted to travel along a railway comprising a wheel blocking wedge adapted to be inserted between a wheel and rail, and means carried by the wedge for fastening the same to the wheel and to the rail.

20. A safety stop for structures adapted to travel along a railway comprising a wheel blocking wedge adapted to be inserted between a wheel and rail and having an inclined surface upon which the wheel may run, and means operated by the wheel in its movement on the wedge for clamping the wedge to the rail.

21. The combination with a structure mounted to travel along a trackway, of holding means operatively connected to said structure and adapted to be clamped to the trackway, said means being operatively responsive to a movement of the structure relative thereto for tightening its clamping engagement with the trackway and for limiting the movement of said structure, and means for rendering said movement limiting means ineffective so as to permit travel of said structure.

22. The combination with a structure mounted to travel along a trackway, of means operatively connected to said structure and adapted to be clamped to the trackway and responsive to a movement of the structure in either direction along the trackway for tightening its clamping engagement with the trackway and for limiting the movement of said structure, and means for rendering said movement limiting means ineffective so as to permit travel of said structure.

23. A safety stop for structures adapted to travel along a railway comprising a wheel blocking wedge adapted to be inserted between a wheel and rail, a rail gripping clamp carried by the wedge, and a wheel gripping clamp carried by the wedge.

24. A safety stop for structures adapted to travel along a railway comprising a wheel blocking wedge adapted to be inserted between a wheel and rail, a rail gripping clamp carried by the wedge, and a wheel gripping clamp carried by the wedge, said last mentioned clamp being operable by the wheel in its movement on the wedge.

25. A safety stop for structures adapted to travel along a railway comprising a wheel blocking wedge adapted to be inserted between a wheel and rail, a rail gripping clamp carried by the wedge, and a wheel gripping clamp carried by the wedge, both of said clamps being operable by the wheel in its movement on the wedge.

26. A safety stop for structures adapted to travel along a railway comprising a wheel blocking wedge adapted to be inserted between a wheel and rail, a pair of pivoted jaws carried by the wedge and adapted to receive the wheel between them, and means carried by the jaws in the path of movement of the wheel for receiving the thrust of the wheels and for transmitting said thrust to the jaws to cause them to grip the wheel.

27. A safety stop for structures adapted to travel along a railway comprising a wheel blocking wedge adapted to be inserted between a wheel and rail, a pair of pivoted jaws carried by the wedge and adapted to receive the wheel between them, means carried by the jaws in the path of movement of the wheel for receiving the thrust of the wheels and for transmitting said thrust to the jaws to cause them to grip the wheel, and means operated by the wheel clamp for clamping the wedge to the rail.

28. The combination with a structure mounted to travel along a railway, of a wheel blocking wedge adapted to be inserted between a wheel and rail, means on said structure for lifting the wedge off the rail and for supporting the same out of contact with the rail, said means permitting relative movement between the structure and wedge when the wedge is on the rail, opposed rail clamping jaws carried by the wedge, and actuating means carried by the wedge and adapted to be operated to press the jaws into gripping engagement with the rail by the thrust of the wheel in engagement with the wedge.

29. The combination with a structure mounted to travel along a railway, of a wheel blocking wedge adapted to be inserted between a wheel and rail, means on said structure for lifting the wedge off the rail and for supporting the same out of contact with the rail, said means permitting relative movement between the structure and wedge when the wedge is on the rail, opposed rail clamping jaws carried by the wedge, and a movable

thrust receiving member on the wedge adapted to be engaged by the wheel, said member being operatively connected to the jaws to press them into gripping engagement with the rail.

30. A safety stop for structures mounted to travel along a railway comprising a wheel blocking wedge adapted to be inserted between a wheel and a rail, a rail clamp carried by the wedge, and a clamp actuating lever carried by the wedge in a position to be engaged and actuated by the wheel.

31. A safety stop for structures mounted to travel along a railway comprising a wheel blocking wedge adapted to be inserted between a wheel and rail, a rail clamp carried by the wedge, a clamp actuating lever carried by the wedge, and means carried by the lever for fastening the same to the wheel.

32. A safety stop for structures mounted to travel along a railway comprising a wheel blocking wedge adapted to be inserted between a wheel and a rail, a rail clamp carried by the wedge, a clamp actuating lever carried by the wedge, and a wheel gripping clamp carried by the lever.

33. A safety stop for structures mounted to travel along a railway comprising a wheel blocking wedge adapted to be inserted between a wheel and rail, a rail clamp carried by the wedge, a clamp actuating lever carried by the wedge, wheel gripping jaws carried by the lever and engageable with opposite sides of the wheel, and thrust transmitting means carried by the jaws and adapted to be operated upon engagement of the wheel therewith to cause the jaws to grip the wheel.

34. A safety stop for structures mounted to travel along a railway comprising a wheel blocking wedge adapted to be inserted between a wheel and rail, opposed rail gripping members connected to the wedge by horizontal pivots, said members having rail engaging jaws below the pivots and arms extending outwardly from the pivots, and a vertically swinging lever carried by the wedge and engageable with said arms to press the jaws against the rail, said lever being in the path of movement of the wheel.

35. A safety stop for structures mounted to travel along a railway comprising a wheel blocking wedge adapted to be inserted between a wheel and rail, opposed rail gripping members connected to the wedge by horizontal pivots, said members having rail engaging jaws below the pivots and arms extending outwardly from the pivots, and a vertically swinging lever carried by the wedge and engageable with said arms to press the jaws into gripping engagement, the free end of said lever being in the path of movement of the wheel.

36. A safety stop for structures mounted to travel along a railway comprising a wheel blocking wedge adapted to be inserted between a wheel and rail, opposed rail gripping members connected to the wedge by horizontal pivots, said members having rail engaging jaws below the pivots and arms extending outwardly from the pivots, a vertically swinging lever carried by the wedge and engageable with said arms to press the jaws into gripping engagement, the free end of said lever being in the path of movement of the wheel.

37. A safety stop for structures mounted to travel along a railway comprising a wheel blocking wedge adapted to be inserted between a wheel and rail, a rail clamp carried by the wedge, a movable clamp actuating member carried by the wedge and means for clamping said actuating member to a wheel on the wedge whereby a rotative movement of the wheel on the wedge acts to tighten the grip of the clamp on the rail.

38. A safety stop for structures mounted to travel along a railway comprising a wheel blocking wedge adapted to be inserted between a wheel and rail, rail clamping jaws carried by the wedge, and movable jaw actuating means carried by the wedge and adapted to be engaged by a part of said structure whereby said means is subjected to the thrust of said structure toward the wedge for exerting a clamping pressure on the jaws proportional to the thrust exerted by the structure against the wedge.

39. A safety stop for traveling structures comprising a wheel blocking wedge adapted to be inserted between a wheel and rail, a rail clamp carried by the wedge, a vertically swinging actuating lever for said clamp mounted on the wedge, the free end of said lever being in the path of movement of the wheel, jaws carried by the lever at the free end thereof, said jaws being mounted to swing toward and from opposite sides of the wheel about axes located outside the planes of the sides of the wheel, said jaws having projections on the inner sides thereof adapted to be engaged by the tread of the wheel.

40. The combination with a structure mounted to travel along a railway, of a wheel blocking wedge adapted to be inserted between a wheel and rail, a rail clamp carried by said wedge, a lever on said wedge for actuating said clamp, said lever having a portion in the path of movement of the wheel and adapted to be actuated by the wheel, means carried by the structure for lifting said wedge and supporting the same out of engagement with the wheel and rail, said lifting means being connected to said lever.

41. The combination with a structure mounted to travel along a railway, of a wheel blocking member adapted to be placed on a rail adjacent a wheel and having a wedge portion at the end adjacent the wheel, a vertically swinging lever pivoted at one end to said member and having its opposite end overly-

ing said wedge portion in the path of movement of said wheel, rail clamping jaws pivoted upon opposite sides of the blocking member and having arms adapted to be engaged and actuated by said lever, a lever carried by said structure, and a flexible connection between the lever on said structure and the lever on said blocking member, said connection permitting relative movement between the structure and blocking member when the blocking member is in engagement with the rail.

42. The combination with a structure adapted to travel along a trackway, of a wheel blocking wedge adapted to be inserted between a wheel and a rail, a lever on said structure connected to said wedge for raising the same off the rail and lowering the same onto the rail, and means for actuating said lever to raise or lower the wedge and for moving said lever bodily to shift the wedge away from the wheel as it is raised and toward the wheel as it is lowered.

43. The combination with a structure adapted to travel along a trackway, of a wheel blocking wedge adapted to be inserted between a wheel and a rail, a lever on said structure connected to said wedge for raising the same off the rail and lowering the same onto the rail, a member movably mounted on the structure to which the lever is pivoted, and means for moving said lever about its pivot and for simultaneously shifting said movable member.

44. The combination with a structure adapted to travel along a trackway, of a wheel blocking wedge adapted to be inserted between a wheel and a rail, a link pivotally suspended from said structure, a lever pivoted to said link and connected to said wedge, means for limiting the movement of the link in one direction, and an abutment on the structure with which the lever engages and which acts as a fulcrum for the lever to cause the link to swing about its pivot.

In testimony whereof, I hereunto affix my signature.

ARTHUR F. CASE.