March 12, 1935. C. E. VAN SYCKLE 1,994,260

RAIL CLAMP

Filed July 28, 1933 3 Sheets-Sheet 1

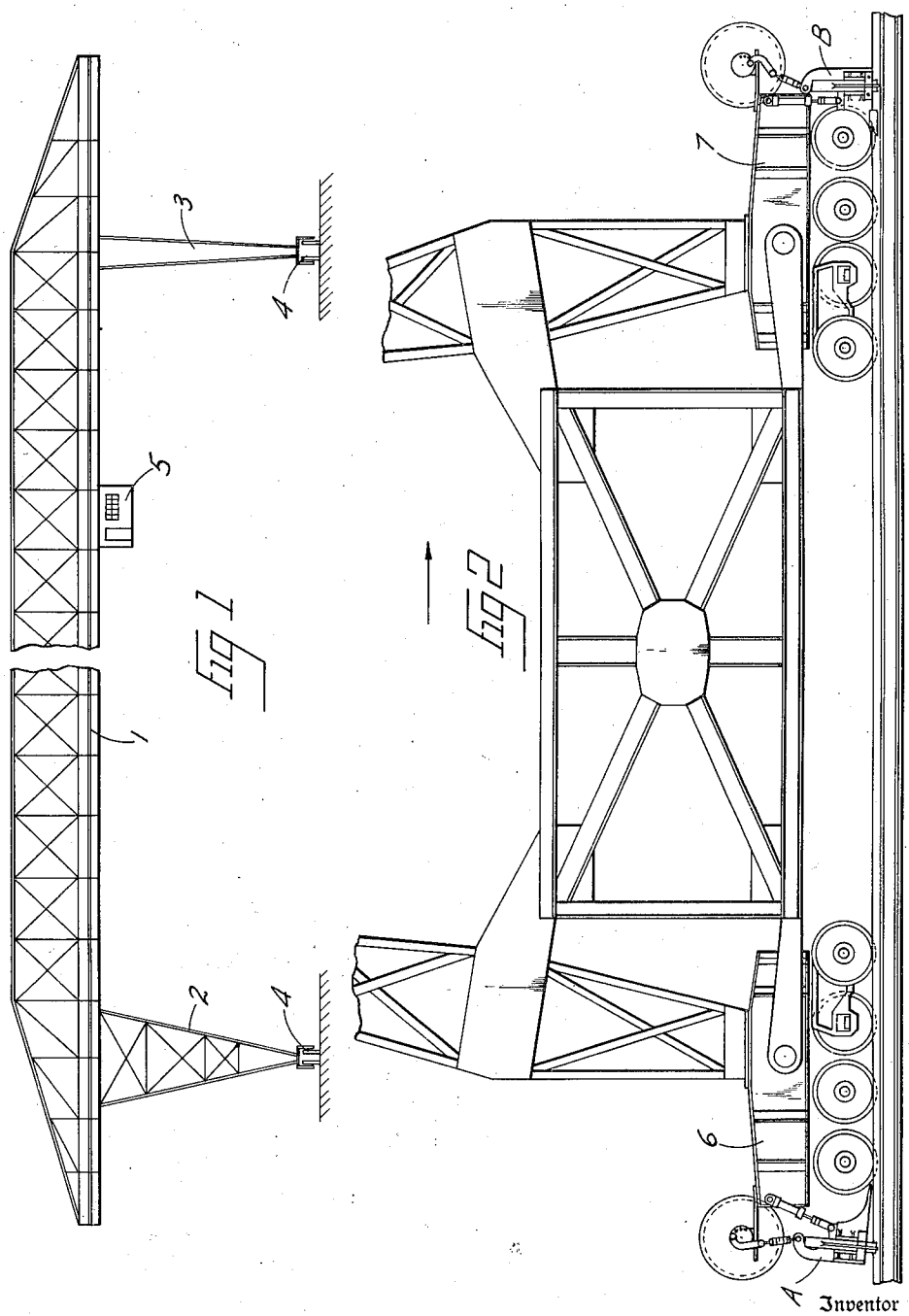


Fig 1

Fig 2

Inventor

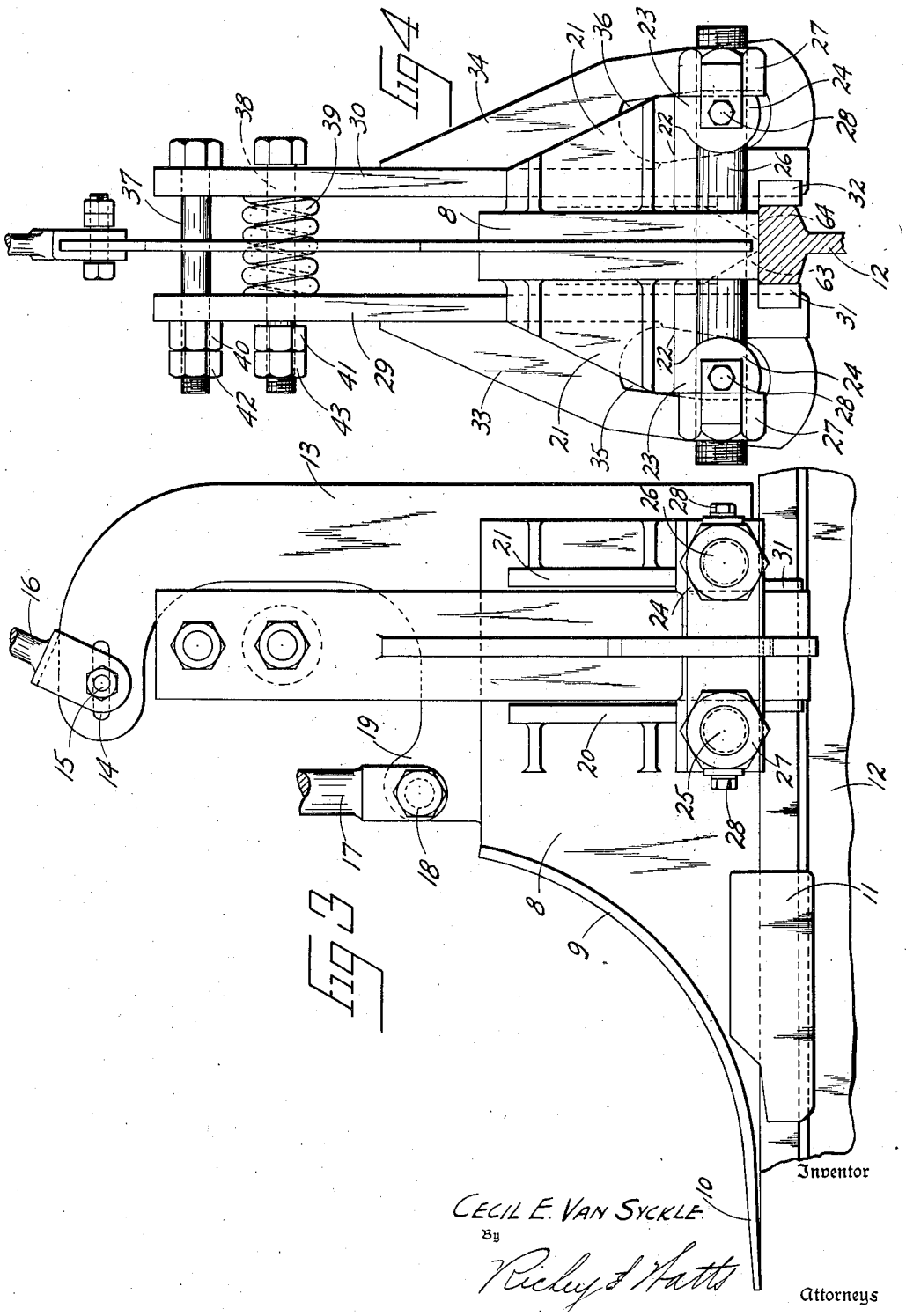
CECIL E. VAN SYCKLE.

By Ricky & Watts Attorneys

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RAIL CLAMP

Filed July 28, 1933 3 Sheets-Sheet 2



Inventor

CECIL E. VAN SYCKLE.

By

Ricky & Watts

Attorneys

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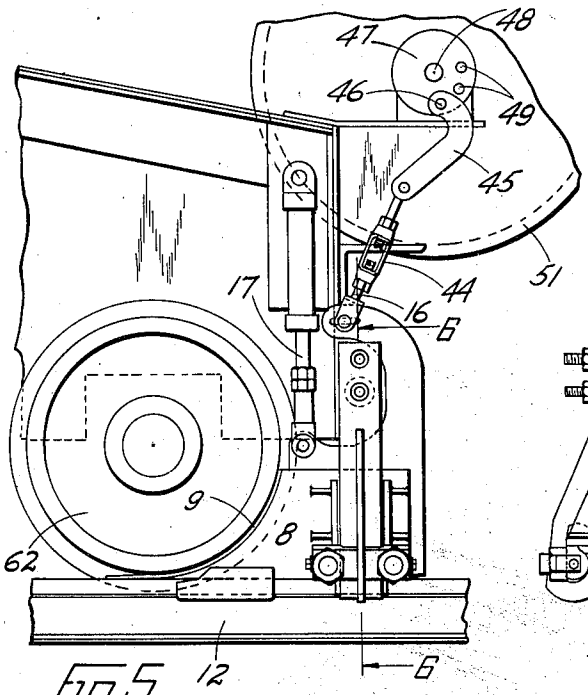


Fig 5

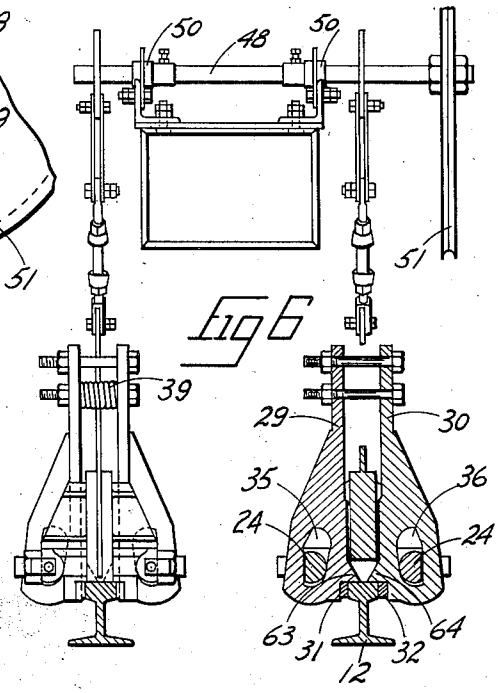


Fig 6

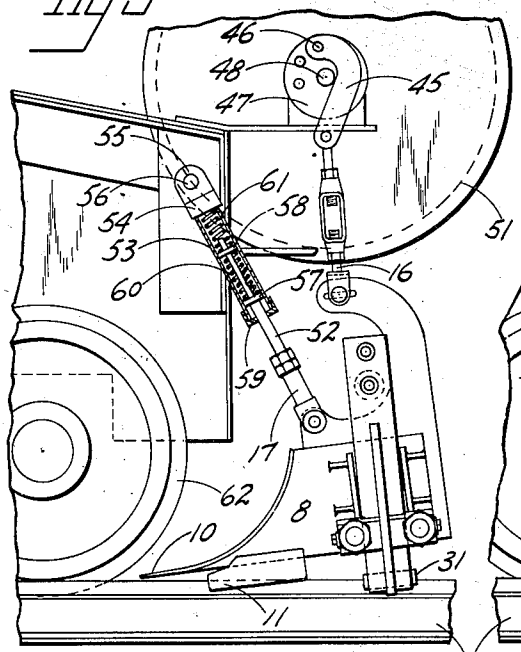


Fig 7

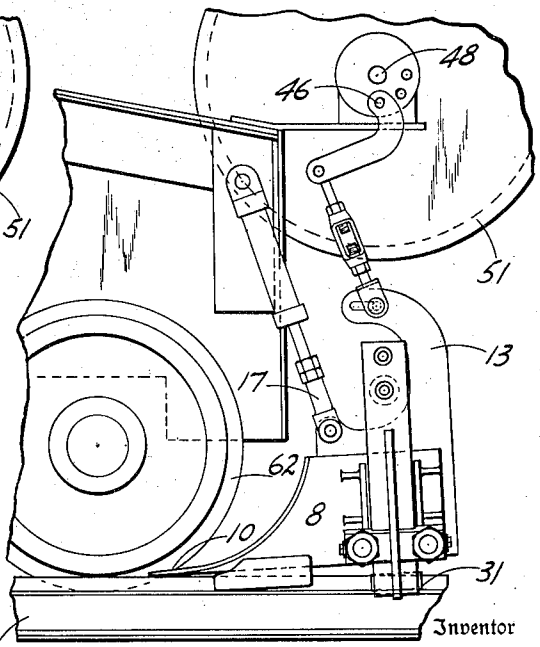


Fig 8

Inventor

By CECIL E. VAN SYCKLE.

Richey & Watts Attorneys

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UNITED STATES PATENT OFFICE

1,994,260

RAIL CLAMP

Cecil E. Van Syckle, Lakewood, Ohio

Application July 28, 1933, Serial No. 682,618

10 Claims. (Cl. 188—43)

This invention relates to mechanisms for stopping or anchoring wheeled structures adapted to move along a trackway. More particularly my invention relates to an improved wheel blocking and rail gripping device especially adapted for use with large material conveying bridges which are mounted on trackways and which must be firmly anchored in position to prevent undesired movement of the structure along the trackway. Material handling bridges of the type referred to are commonly used for transferring ore, coal, stone, etc. and, as they are usually very large structures and present considerable surface to the wind, means must be provided for firmly anchoring the structure in position on the trackway to prevent it from being blown out of position and possibly seriously damaged or wrecked.

I am aware that a number of different devices have been proposed and used to prevent undesired movement of material handling bridges. Some of these arrangements contemplate means for clamping the rails, others provide means for blocking the wheels and still others combine the rail clamping and wheel blocking mechanisms.

It is among the objects of my invention to provide an improved form of rail clamping and wheel blocking device which is particularly adapted for use with traveling material handling bridges and which is of simple design and adapted to effectively prevent movement of the structure when in blocking position and to be readily moved from blocking position in order to permit movement of the structure along the track.

Other objects of my invention are: the provision of a wheel blocking and rail clamping device in which the movement of the wheel blocking member into blocking position on the rail actuates the rail clamping mechanism; the provision of means for supporting a rail clamping and wheel blocking device which is adapted to quickly and accurately move said device into or out of clamping and blocking position; the provision of a rail clamping and wheel blocking device which may be readily adjusted to give the desired degree of clamping action on the rail; the provision of a rail clamping and wheel blocking device which is particularly adapted to economical construction and which is of sturdy construction having a minimum of moving parts whereby repairs and replacements are practically eliminated.

The above and other objects of my invention will appear from the following description of a preferred embodiment thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a diagrammatic illustration, in side elevation, of the type of material handling bridge with which my invention may be advantageously used.

Figure 2 is an enlarged end elevation of one leg of a bridge structure showing the wheel trucks and illustrating a pair of my improved rail clamping and wheel blocking devices disposed so that they may be positioned to prevent movement of the structure along the rail in either direction.

Figure 3 is an enlarged side elevation of my apparatus in blocking and clamping position.

Figure 4 is an end elevation of the apparatus shown in Figure 3 showing the device in clamping position and illustrating the rail in cross section.

Figure 5 is a fragmentary view illustrating the installation of my invention on a traveling bridge structure and showing the device in clamping and blocking position.

Figure 6 is an end elevation of the apparatus shown in Figure 5 and illustrating a pair of clamping devices in the same position as shown in Figure 4, one of said devices being shown in cross section taken substantially on line 6—6 of Figure 5.

Figure 7 is a view generally similar to Figure 5 but illustrating some of the parts in fragmentary cross section and showing the clamping and blocking device in elevated position.

Figure 8 is a view generally similar to Figure 7 but showing the clamping and blocking device in the position it assumes when it has been lowered into operating position but before the wheel of the traveling structure has engaged the wheel blocking member.

Referring to the drawings, the structure shown in Figure 1 comprises an elevated bridge structure 1 supported on legs 2 and 3 which carry wheels 4 at the lower end thereof whereby the entire bridge structure may be moved along the supporting trackway. A control cab 5 is usually provided in which all of the controls of the bridge may be centralized. Figure 2, which is an enlarged view of the lower end of the leg 2, shows a conventional leg structure provided with a pair of eight-wheeled trucks 6 and 7, it being noted that these trucks are spaced a considerable distance in order to provide a film support for the bridge.

In the arrangement illustrated two of my rail clamping and wheel blocking devices, generally indicated at A and B, are provided and it will be understood that an additional set of wheel blocking and clamping devices may be installed on the legs 3 of the structure. With this arrangement

it is possible to prevent movement of the bridge in either direction by merely placing the proper set of blocking devices in operative position. As illustrated the device B is in position to block the wheels and clamp the structure to the rail while the device A is in its elevated position. This is the normal position for the units when it is desired to resist movement of the bridge structure in the direction of the arrow in Figure 2.

The details of my improved rail clamping and wheel blocking device are best seen in Figures 3 and 4. The wheel blocking member 8 is formed with a curved forward surface 9 which is adapted to be engaged by and block a wheel and a forwardly extending relatively thin edge portion 10 which projects under the wheel when the device is in blocking position and is adapted to facilitate the movement of the wheel onto the block, as will be later described.

Downwardly extending flanges or plates 11 are disposed on either side of the block 8 and are adapted to guide the block and keep it in proper position relative to the rail 12. The block 8 is secured to and supported by the relatively thin upwardly extending arm 13 which is provided with a slot 14 at its upper end through which the attaching bolt 15 passes. The supporting link 16 is thus pivotally secured to the upper end of the member 13. A second supporting and guiding link 17 is pivotally secured to the member 13 by means of the bolt 18 which passes through a suitable aperture in the lip 19 of the member 13.

A pair of spaced outwardly projecting thrust transmitting flanges or webs 20 and 21 extend from the sides of the block 8 and are formed with horizontal bottom surfaces 22 which are adapted to engage the upwardly extending lug portions 23 of the actuating bars 24 and resist upward movement thereof. The two bars 24 are tied together by the transversely extending tie rods 25 and 26 which pass through suitable holes in the bars 24 and are threaded at their ends to accommodate the nuts 27 which hold the assembly together.

As the tie rods 25 and 26 extend through the block 8 it will be seen that the block 8, the flanges 20 and 21, the tie rods 25 and 26 and the bars 24 are in effect an integral unit. The bars 24 are held in abutting relation with the inner faces of the nuts 27 by means of set screws 28. By loosening the set screws 28 and changing the positions of the nuts 27 the distance between the bars 24 may be adjusted.

The rail clamping portion of my apparatus comprises the vertically extending arms 29 and 30 which carry wear resisting inserts 31 and 32, of hardened steel, abrasive material or the like, at their lower ends. Reinforcing webs 33 and 34 extend outwardly from the sides of the arms 29 and are provided with slots 35 and 36 in their lower portions. The bars 24 pass through and have a sliding fit in the slots 35 and 36 and, as is seen in Figure 4, the sides of the slots 35 and 36 slope downwardly and outwardly for purposes which will be later explained. A tie bolt 37 extends through the upper ends of the arms 29 and 30 and a second bolt 38 also extends through the arms 29 and 30 and supports the relatively heavy spring 39 which is disposed between the arms 29 and 30. These bolts 37 and 38 fit loosely in holes in the arms 29 and 30 and the effective length of the bolts may be adjusted by means of the nuts 40 and 41. Lock nuts 42 and 43 are preferably provided to maintain the desired adjusted position of the nuts 40 and 41.

The supporting connections for the rail clamping and wheel blocking device are best seen in Figures 5, 6, 7 and 8 and include the main supporting link 16 and the auxiliary supporting link 17. A turn buckle 44 is inserted in the link 16 whereby its length may be adjusted and the upper end of the link 16 is pivotally connected to the hook shaped member 45. Secured to the disc 47, which is secured to the cross shaft 48, is a crank pin 46. For purposes of adjustment I prefer to provide several holes 49 in the disc 47 so that the position of the pin 46 may be changed to give the proper degree of lift for various installations. The upper end of the hook shaped link 45 is pivotally supported by the pin 46 and the shaft 48 is mounted in suitable bearings 50 on the leg of the bridge. The sheave or sprocket 51 is secured to the shaft 48 and suitable chains or ropes (not shown) are adapted to pass around the sheave 51 to a prime mover (not shown) such as an electric motor or the like which may be advantageously controlled from the operating cab 5 of the bridge.

The guide link 17 comprises a rod 52 which extends into a tubular sleeve 53. This sleeve 53 has an upper end cap 54 which is provided with a flattened extension 55 and is pivotally mounted on a suitable pin 56 projecting out from the frame of the structure. The rod 52 is provided with an integral flange portion 57 and a sliding washer 58 and the bottom end cap 59 of the sleeve 53 prevents removal of the rod 52 therethrough. Coil springs 60 and 61 are disposed within the sleeve 53 on either side of the washer 58.

From the above description of the link 17 it will be seen that the length of this member is variable, it being longest when the flange 57 is in engagement with the end cap 59 and being adapted to become shorter upon the exertion of a force against its lower end causing the springs 60 and 61 to be compressed and the flange 57 to be moved upwardly away from the cover plate 59.

The operation of the above described apparatus is as follows:

When the parts are in the positions shown in Figure 7 the pulley 51 may be considered to have been rotated to the point where the pin 46 is disposed at substantially its highest point above the shaft 48. The hook shaped link 45 and the link 16 support the rail clamping and wheel blocking device in elevated position out of contact with the rail 12. The guide link 17 holds the block 8 in an angular position relative to the rail with the point 10 of the block 8 preferably just clearing the rail top. It will be noted that the downwardly extended guide flanges 11 are still in position to keep the block 8 properly aligned above the rail 12 and the gripping members 31 and 32, although not in position to grip the rail, have not been elevated completely away from the rail. Figure 7 illustrates the position of the device when it is elevated out of contact with the rail so that the bridge may be moved on the trackway or when it is not desired to use the clamping and blocking apparatus.

When it is desired to place the clamping and blocking device in operating position the sheave 51 is turned, either by hand or by means of a suitable prime mover as above noted, through an angle of approximately 180° or until the pin 46 is at substantially its lowest position below the shaft 48 (see Figure 8). The supporting member

13 and the block 8 are thus permitted to drop down until the point 10 of the block 8 engages the rail. However, the opposite end of the block 8 is still held above the rail 12 by the now fully extended link 17 and the action of the bars 24 in the slots 35 and 36. As seen in Figure 8 the entire unit has moved closer to the wheel 62 and the point 10 of the block 8 is close to the point of contact of the rail and wheel. Now the operator of the bridge causes the wheels to rotate in a direction to move the wheel 62 toward the block 8 and the wheel 62 will roll up on the end 10 of the block 8 and finally come to rest in the position shown in Figure 5 where it is seen in engagement with the surface 9 of the block 8. When in this position the wheel is effectively blocked against movement along the track and also the clamping members 31 and 32 have been caused to exert a strong clamping force on the sides of the rail 12. This clamping action is caused by the downward movement of the block 8 which occurs when the wheel 62 rolls into the position shown in Figure 5.

As is best seen in Figure 4 and in the sectional view of the right hand clamping and blocking unit shown in Figure 6, the arms 29 and 30 are provided with inwardly extending lugs 63 and 64 which are adapted to engage the top surface of the rail 12 when the parts reach the position shown in Figure 8. Thus, further downward movement of the arms 29 and 30 and the clamping jaws 31 and 32 will be prevented and the movement of the block 8 from the position shown in Figure 8 into that shown in Figure 5 will cause the bars 24 to move downwardly in the slots 35 and 36. Due to the fact that the walls of the slots 35 and 36 slope downwardly and outwardly this downward movement of the bars 24 will cause the gripping jaws 31 and 32 to be brought into gripping contact on the sides of the rail 12. By positioning the slots 35 and 36 near the lower part of the arms 29 and 30 a large mechanical advantage may be secured which is augmented by the wedging action of the slots 35 and 36 and the desired degree of grip on the rail can readily be obtained. The spring 39 is adapted to permit the upper ends of the arms 29 and 30 to be moved together during the clamping action thus compressing the spring 39. However, this movement will be relatively small when the parts are properly adjusted and the spring is provided mainly in order to act as a safety member to prevent breakage which might occur in gripping the rail at points where for any reason the rail head is wider than standard.

It will be seen that by adjusting the position of the nuts 40 and 41 the action of the spring 39 can be controlled and, as the spring opposes the action of the bars 24 when they move downwardly in the slots 35 and 36, any desired degree of gripping action, within reasonable limits, can be obtained by proper adjustment of the nuts 40 and 41 on the bolts 37 and 38.

Thus, when the apparatus is in the position shown in Figure 5 the wheel 62 is completely blocked by the block 8 and this block 8 is prevented from sliding along the rail by the clamping action exerted by the bars 24 on the gripping members 31 and 32 to cause them to grip the sides of the rail 12. It will be seen that the entire weight of the bridge structure is available to cause the side clamping of the rail and that the downward movement of the block 8, caused by the weight of the bridge structure, actuates the side gripping clamps.

When it is desired to release the blocking and clamping device the bridge structure is merely moved to the left, (Figure 5) thus causing the wheel 62 to roll off the block 8. The spring 39 will now tend to spread apart the gripping members 31 and 32 and, upon rotation of the sheave 51 and the disc 47 into the position shown in Figure 7 the entire clamping and blocking apparatus will be lifted up and swung away from the wheel 62 into its original position, as shown in Figure 7. It should be noted that, when the parts are as indicated in Figure 5, the guiding link 17 may have been shortened a certain amount due to compression of the spring 60 and 61. This compression of the springs 60 and 61 exerts an additional downward force on the blocking member 8.

Although the above description has referred only to a single rail clamping and wheel blocking device it is customary in apparatus of this kind to support each end of the bridge on double rails. This is seen in Figure 6, in which two clamping and blocking units are shown supported from a single shaft 48 and operated by a single sheave 51. It will be understood by those skilled in the art that the control apparatus and the driving connections to the sheave 51 may be so arranged that all of the gripping and blocking members on one side of the bridge may be simultaneously lowered into and lifted out of operating position and that, although I have illustrated and described in considerable detail a preferred embodiment of my invention, modifications and variations may be made in the specific form thereof without departing from the spirit of my invention. I do not, therefore, wish to be limited to the exact form herein illustrated and described but claim as my invention all embodiments thereof coming within the scope of the appended claims.

I claim:

1. In apparatus of the type described, a wheel block, rail gripping members adapted to engage the sides of a rail and means for causing relative movement of said block and said gripping members whereby movement of said block relative to said gripping members will cause a gripping force to be exerted by said members on the rail.

2. In combination in rail gripping and wheel blocking apparatus, a wheel blocking member, means for lifting said wheel blocking member away from and lowering said wheel blocking member toward the rail, side gripping members adapted to be moved into and out of gripping engagement with the sides of the rail, means for limiting the downward movement of said side gripping members and means whereby movement of said wheel block toward the rail after said gripping members have reached the downward limit of their movement will cause said gripping members to grip the rail.

3. In combination with a wheeled structure adapted to move along a trackway, a wheel blocking and rail clamping device including a wheel block, and means for supporting said device from said structure adjacent a wheel thereof whereby the device may be moved toward and away from a rail of said trackway, said supporting means including a rotatable crank member, linkage connecting said crank and said device, and an auxiliary supporting and guiding link pivotally connected at one end to said structure and at its opposite end to said device and adapted to maintain said wheel block angularly

disposed relative to the rail while said device is in elevated position.

4. In combination with a wheeled structure adapted to move along a trackway, a wheel blocking and rail clamping device including a wheel block, and means for supporting said device from said structure adjacent a wheel thereof whereby the device may be moved toward and away from a rail of said trackway, said supporting means including a rotatable crank member, linkage connecting said crank and said device, and an auxiliary supporting and guiding link pivotally connected at one end to said structure and at its opposite end to said device, said auxiliary link being provided with a resilient section and being adapted to maintain said wheel block angularly disposed relative to the rail while said device is in elevated position.

5. In combination with a wheeled structure adapted to move along a trackway, a wheel blocking and rail clamping device including a wheel block, and means for supporting said device from said structure adjacent a wheel thereof whereby the device may be moved toward and away from a rail of said trackway, said supporting means including a rotatable crank member, linkage having a section adjustable as to length and connecting said crank and said device and an auxiliary supporting and guiding link pivotally connected at one end to said structure and at its opposite end to said device and adapted to maintain said wheel block angularly disposed relative to the rail while said device is in elevated position.

6. In a wheel blocking and rail clamping device, a pair of rail clamping members adapted to engage a rail on opposite sides thereof, a wheel block, arms for supporting said clamping members whereby they may be moved into and out of clamping position, said supporting arms having downwardly diverging surfaces, and means carried by said block and adapted to engage said surfaces whereby movement of said block downwardly relative to said clamping members will move said clamping members toward each other.

7. In a wheel blocking and rail clamping device associated with a wheeled structure mounted on a trackway, a wheel block, rail clamping members, spring means adapted to exert a force tending to maintain said clamping members in released position and means, effective upon downward movement of said block relative to said clamping members, for moving said clamping members into clamped position.

8. In apparatus of the class described for preventing movement of a wheeled structure, a wheel block, means secured to the structure for supporting said block adjacent a wheel whereby said block may be lifted out of and lowered into operative position, rail clamping means supported by said block and movable relative thereto, and means for moving said clamping means into and out of clamping position upon relative movement of said block and clamping means.

9. In apparatus of the class described for preventing movement of a wheeled structure, a wheel block, means secured to the structure for supporting said block adjacent a wheel whereby said block may be lifted out of and lowered into operative position, rail clamping means supported by said block and movable relative thereto and means for moving said clamping means into and out of clamping position upon relative movement of said block and clamping means, said clamping and unclamping means including a spring adapted to exert a force tending to hold said clamping means in unclamped position, a pair of slotted members secured to said clamping means and formed with downwardly diverging slots, a pair of actuating bars secured to said block on opposite sides thereof, one of said bars extending through the slot in one of said slotted members and the other of said bars extending through the slot of the other of said slotted members, and rail engaging lugs associated with said rail clamping means, said rail engaging lugs being adapted to engage the rail when said block is lowered into operating position to hold said clamping means and slotted members from further downward movement while permitting further downward movement of said block and actuating bars.

10. In apparatus of the type described, a wheel block adapted to engage a wheel and the rail on which the wheel rests, rail gripping members adapted to engage the sides of said rail, and means for causing relative movement of said block and said gripping members whereby movement of said block relative to said gripping members will cause a gripping force to be exerted by said members on the rail.

CECIL E. VAN SYCKLE.