Dec. 6, 1927. 1,651,656

G. B. YERKES

STABILIZER FOR LOCOMOTIVE CRANES

Filed Sept. 18, 1925 2 Sheets-Sheet 1

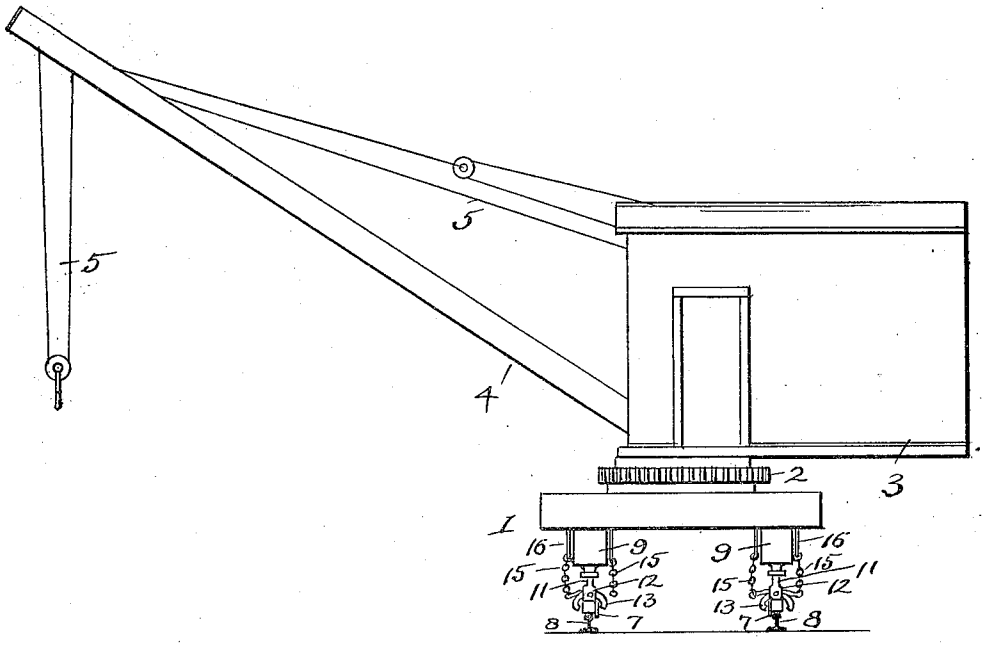


Fig. 1.

Inventor
George B. Yerkes.
Kerr Hudson & Kent
attys.

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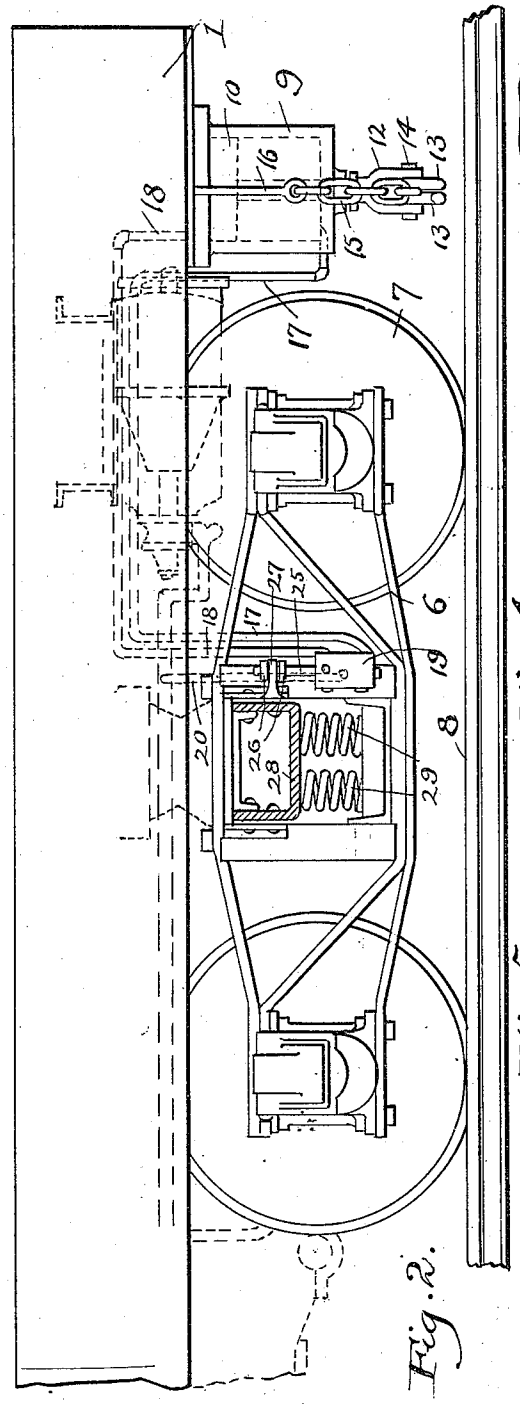


Fig. 2.

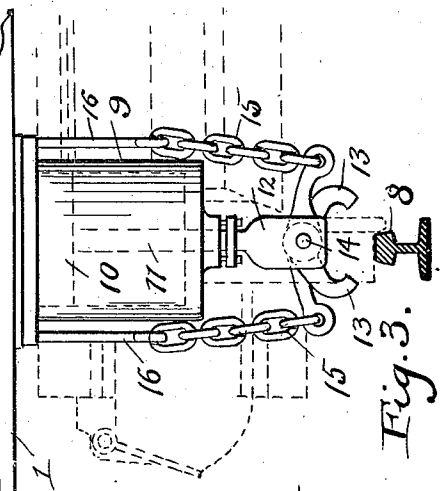


Fig. 3.

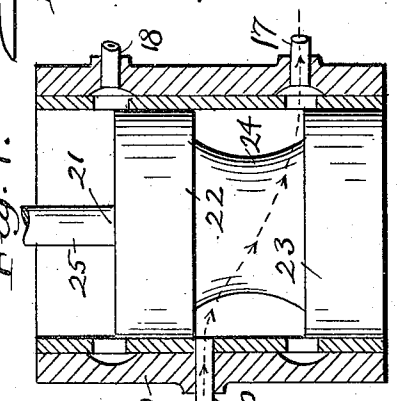


Fig. 4.

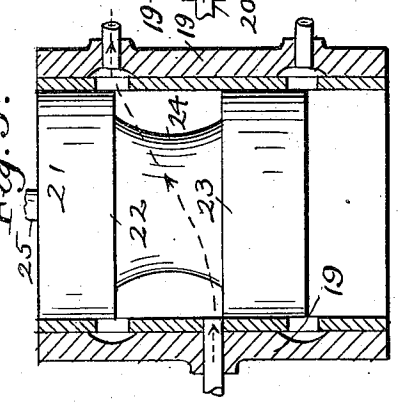


Fig. 5.

Inventor:
George B. Yerkes.
Knox Hudson & Kent
attys.

Patented Dec. 6, 1927. 1,651,656

UNITED STATES PATENT OFFICE.

GEORGE B. YERKES, OF CORAOPOLIS, PENNSYLVANIA, ASSIGNOR TO THE McMYLER INTERSTATE COMPANY, OF BEDFORD, OHIO, A CORPORATION OF OHIO.

STABILIZER FOR LOCOMOTIVE CRANES.

Application filed September 18, 1925. Serial No. 57,062.

The present invention relates particularly to a stabilizer for locomotive cranes but is applicable generally to carriages which travel along trackways to prevent lateral tipping of the carriages.

When a locomotive crane is being operated with its load carrying boom projecting laterally to one side or the other of the supporting carriage, it is necessary when heavy loads are being handled to provide means for preventing the supporting carriage from tipping over. This has heretofore been accomplished by providing ground engaging struts on the carriage or boom or by clamping the carriage to the track rails. In so far as I am aware, the stabilizing devices heretofore employed have not been such as would permit of free travel of the crane along the trackway, and it is the principal object of this invention to provide a stabilizing device which is normally free from engagement with the trackway and permits the crane to travel freely along the trackway, the device being automatically operated to hold the carriage to the track whenever a load sufficient to tip the carriage is imposed on the boom.

More specifically it is the object of the present invention to provide means controlled by laterally tilting movements of a carriage on a railway track for automatically clamping the carriage to the track to prevent its tipping over.

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 that 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 an end elevation of a locomotive crane to which the invention is applied, the boom of the crane being shown in a position extending laterally from the carriage; Fig. 2 is an enlarged fragmentary side elevation of the carriage showing one of the trucks and the rail clamping device associated therewith; Fig. 3 is a front elevation of one of the rail clamps; Figs. 4 and 5 are sectional detail views showing the pressure controlling valve in normal and shifted positions.

The present invention is designed especially for use upon locomotive cranes and Fig. 1 of the drawing shows a locomotive crane in which the carriage body 1 has a turntable 2 thereon upon which is mounted the house 3 in which the crane operating mechanism is enclosed. The boom 4 extends upwardly and outwardly from the turntable and has a hoist line 5 suspended from its outer end by means of which the loads may be lifted. The carriage consists of the body 1 and a suitable number of trucks 6 having wheels 7 which travel upon the rails 8 of the trackway.

The structure so far described is all old and well known, the present invention being a mechanism mounted upon the carriage for preventing the carriage from being tipped over by heavy loads supported upon the outer end of the boom. While the device is particularly useful on locomotive cranes, it is applicable to any carriage travelling upon a railway track where it is desirable to provide means for preventing lateral tipping of the carriage. Adjacent the opposite sides thereof and directly above the track rails 8, the carriage body 1 has vertically disposed fluid pressure cylinders 9 secured to the under side thereof, each cylinder having a piston 10 therein provided with a downwardly extending piston rod 11 which extends through and has a fluid tight fit in the lower end of the cylinder. Each piston rod 11 has a forked lower end 12 in which rail clamping jaws 13 are pivoted on a horizontal pivot pin 14 which extends through the forked end 12 and through the jaws 13 intermediate the ends thereof. The lower ends of the clamping jaws 13 are formed to fit over the opposite sides of the ball of the rail 8 and the upper ends thereof are connected to chains 15 which are suspended

by eye-bolts 16 secured to the under side of the body 1. When the piston 10 is held in its uppermost position, the clamping jaws 13 are supported entirely above the top of rail 8 and the jaws are held by gravity in open position. When piston 10 is moved downwardly the piston rod 11 carries the pivot pin 14 of the clamping jaws downwardly towards rail 8, and since the upper ends of the jaws are held against downward movement by the chains 15, the jaws 13 will move to closed position as the piston is moved downwardly, the jaws being so mounted with respect to the rail 8 that they will grip the ball of the rail between them when they are closed by the downward movement of the piston.

Means is provided for supplying and exhausting pressure to and from either side of the piston 10, pressure from the train air pipe being employed for actuating the clamps. Each cylinder has a pipe line 17 connected to the lower end thereof and a pipe line 18 connected to the upper end thereof, the pipe 17 leading to the lower portion of a cylindrical valve casing 19 and the pipe 18 leading to the upper portion of said casing. A pipe 20 leads from the train air line to the central portion of the casing 19, and the pressure to the cylinder 9 is controlled by a spool valve 21 slidably mounted within the casing 19. The valve 21 has cylindrical upper and lower end portions 22 and 23 which have a fluid tight fit within the casing 19 and an intermediate portion 24 of reduced diameter which forms an annular air chamber between the end portions 22 and 23 as shown in Fig. 4. The valve 21, when in its lowermost position, establishes communication between the pressure pipe 20 and the pipe line 17 so that air under pressure is directed to the lower end of cylinder 9 to move the piston 10 upwardly and hold it in its uppermost position. When the valve 21 is in the upper end of the casing 19 as shown in Fig. 5, communication is established between the pressure pipe 20 and the pipe line 18 leading to the top of the cylinder 9 to direct air under pressure into the cylinder above the piston 10 to force the piston 10 downwardly and move the clamp into engagement with the rail. The upper and lower ends of the casing 19 are open so that when the valve is in the position shown in Fig. 4 air can escape through the air pipe 14 through the upper portion of the cylinder 9 into the casing 19 above the valve while pressure is being supplied to the lower end of the cylinder. When the valve 21 is in its uppermost position as shown in Fig. 5, air may escape through the pipe line 17 from the lower portion of the cylinder 9 into the casing 18 beneath the lower end of the valve 21. It will be apparent that if the valve 21 be held in its lowermost position shown in Fig. 4, pressure will be maintained in cylinder 9 beneath the piston 10 and the clamp will be held out of engagement with the rail, and whenever the valve 21 is moved upwardly to the position shown in Fig. 5, the piston 10 will be moved downwardly and the clamp will be moving into gripping engagement with the rail 8.

An important feature of the present invention is the provision of means for automatically controlling the position of the controlling valve 21 in such a manner that the valve will be normally held in its lowermost position shown in Fig. 4, but will be automatically shifted to its uppermost position shown in Fig. 5 whenever there is a tilting movement of the carriage toward the side of the track opposite that upon which the controlling valve and the clamp controlled thereby are mounted. To this end the valve 21 is provided with an upwardly projecting stem 25 which has two fixed collars 26 thereon which receive between them a projecting arm or lug 27 fixed to a cross beam 28 carried by the body 1 of the carriage. The opposite ends of the cross beam 28 extend into the frames of the opposite trucks 6 and are supported upon suitable springs 29 carried by the trucks. The valve 21 is normally held in its lowermost position but if the carriage body has a lateral tilting movement with respect to the trucks which takes a portion of the weight from the springs 29 on one side of the carriage, the valve stem 25 will move upwardly with the beam 28 and shift the valve from the position shown in Fig. 4 to position shown in Fig. 5, whereupon the pressure is exhausted from the under side of the piston 10 and pressure is admitted from above the top thereof so that the rail clamps will instantly move to clamping position in engagement with the rail 8. The clamp, or clamps, on one side of the carriage are operated independently of those upon the other side, and the clamps on each side are controlled by a shifting of weight causing a portion of the pressure on the springs 29 at one side of the carriage to be relieved sufficiently to permit the springs to lift the end of the cross bar engaged thereby. Assuming that the crane is positioned as shown in Fig. 1, if a heavy load be imposed on the hoist cable 5, the center of gravity will be shifted to a point to the left of the left hand rail 8 and would cause the carriage to tip over if means were not provided for checking the tipping movement of the carriage. However, whenever such a condition occurs, the pressure upon the springs 29 on the right hand side of the carriage is relieved and these springs push the right hand end of the cross beam 28 upwardly operating the controlling valve 21 and setting the clamp or clamps on the right hand side of the carriage, securely hold the carriage against tipping. If the boom be swung laterally

until the load is shifted sufficiently to bring the center of gravity of the loaded crane over the track the stability of the carriage will be reestablished and the controlling valve will be pushed downwardly to its normal position causing the clamp or clamps to be instantly released from the rails and leaving the carriage free to travel along the trackway.

Having described my invention, what I claim is:

1. In a device of the character described, a carriage adapted to travel upon a trackway, said carriage having a truck, and a body yieldably supported on the truck, means movably mounted on the carriage and engageable with the trackway to prevent tipping of the carriage, means for normally holding said trackway engaging means in a position clear of the trackway, and means controlled by a movement of the body with respect to the truck for moving said engaging means into engagement with the trackway.

2. In a device of the character described, a carriage adapted to travel upon a railway track, said carriage having a truck and a body yieldably supported on the truck, a rail clamp mounted on the carriage, means for actuating the clamp, and means operated upon a relative movement between the body and truck for controlling said clamp actuating means.

3. In a device of the character described, a carriage adapted to travel upon a railway track and comprising a truck, a body, and springs interposed between the body and truck at opposite sides thereof, a vertically movable member carried by the body, a clamp having rail clamping jaws carried by said member, means for normally holding said member in elevated position and said jaws in open position above the rail, and means controlled by an upward movement of the side of the body carrying the clamp away from the truck for lowering said clamp carrying member and closing said jaws on the rail.

4. In a device of the character described, a carriage adapted to travel upon a railway track and comprising a truck, a body, and springs interposed between the body and truck at opposite sides thereof, a rail clamp on the carriage, means for normally holding the clamp clear of the rail, and means controlled by a lateral tilting movement of the body on the truck for moving the clamp into gripping engagement with the rail.

5. In a device of the character described, a carriage adapted to travel upon a railway track, a vertically movable member mounted on the carriage, a pair of rail gripping jaws pivoted to said member, means for raising and lowering said member, means connected to the carriage and to said jaws for closing the jaws during downward movement thereof, and means operable upon a tilting movement of the carriage for controlling said first mentioned means.

6. In a device of the character described, a carriage adapted to travel along a railway track, a vertically disposed fluid pressure cylinder mounted on the carriage, a piston in the cylinder having a rod extending through the lower end of the cylinder, a pair of rail clamping jaws pivoted to the lower end of the piston rod, links connecting said jaws to the carriage to cause the jaws to close during downward movement thereof, means for admitting pressure to and exhausting pressure from the cylinder to actuate the piston, and means operable upon a tilting movement of the carriage for controlling said pressure admitting means.

7. In a device of the character described, a carriage adapted to travel along a railway track, a vertically disposed fluid pressure cylinder mounted on the carriage, a piston in the cylinder having a rod extending through the lower end of the cylinder, a pair of rail clamping jaws pivoted to the lower end of the piston rod, links connecting said jaws to the carriage to cause the jaws to close during downward movement thereof, and means controlled by tilting movements of the carriage for admitting pressure to and exhausting pressure from the cylinder to actuate the piston.

8. In a device of the character described, a carriage adapted to travel upon a railway track, said carriage having a truck and a body yieldably supported on the truck, a rail clamp on the carriage, fluid pressure clamp actuating means, and means responsive to relative movements between the body and truck for controlling said actuating means.

9. In a device of the character described, a carriage adapted to travel upon a railway track, said carriage having a truck and a body yieldably supported on the truck, rail clamps upon opposite sides of the carriage, a fluid pressure actuating means for each clamp, and separate means upon opposite sides of the truck for controlling the rail clamps, said controlling means being operated upon an upward movement of the body on the side on which the controlling means is located to cause the clamp on said side to be actuated.

10. In a device of the character described, a carriage adapted to travel upon a railway track, said carriage having a truck and a body yieldably supported to the truck, rail clamps upon opposite sides of the carriage, a fluid pressure cylinder for actuating each clamp, a valve controlling the supply of pressure to said cylinder, and means responsive to relative movements between the truck and body for operating said valve.

11. In a device of the character described,

a carriage adapted to travel upon a railway track, said carriage having a truck and a body yieldably supported on the truck, rail clamps upon opposite sides of the carriage, a fluid pressure cylinder for actuating each clamp, and a valve controlling the supply of pressure to said cylinder, said valve having two relatively movable parts one operatively connected to the truck and the other to the body.

In testimony whereof, I hereunto affix my signature.

GEORGE B. YERKES.