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MECHANISM FOR LOCKING THE BRAKE ASSEMBLY FOR RAILROAD CARS

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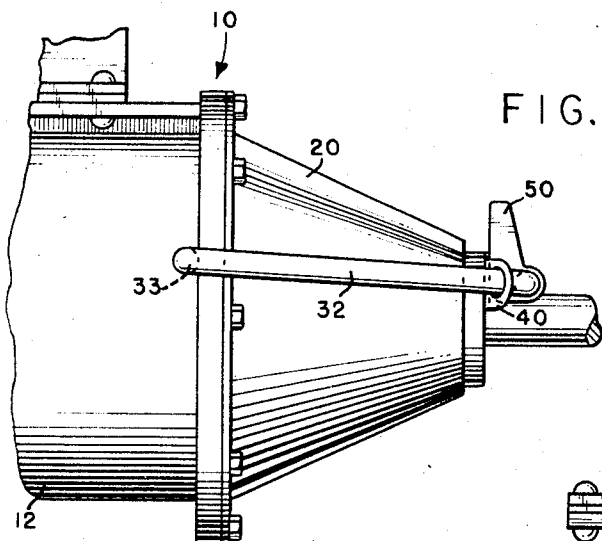


FIG. 1.

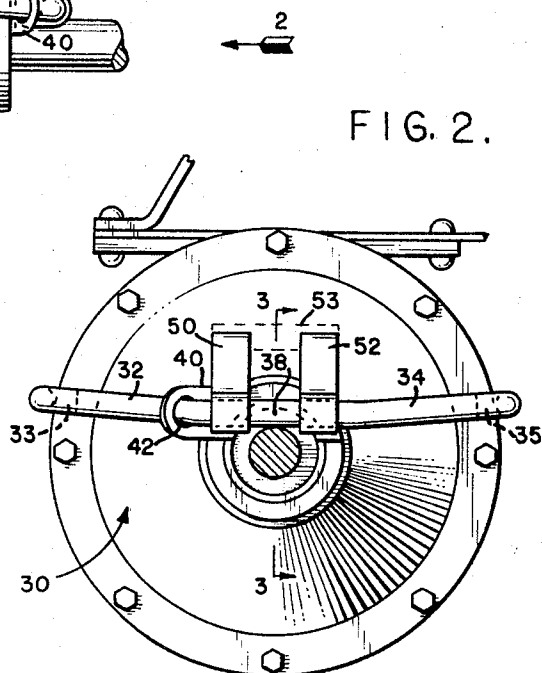


FIG. 2.

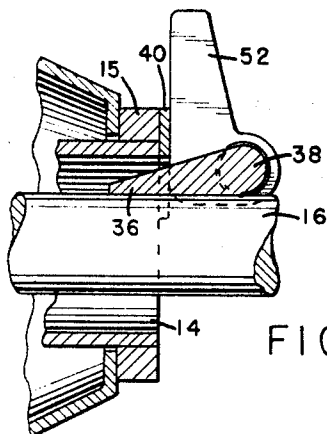


FIG. 3.

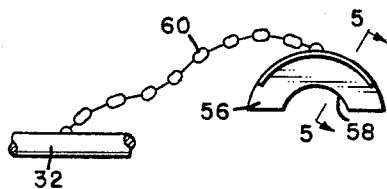


FIG. 4.



FIG. 5.

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MECHANISM FOR LOCKING THE BRAKE ASSEMBLY FOR RAILROAD CARS

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9 Claims

ABSTRACT OF THE DISCLOSURE

A locking means for brake assemblies of railroad cars to provide a positive brake system locking action for railroad car brake assemblies during movement or repair thereof. The locking mechanism being an arm abutting a portion of the brake cylinder and the outer end of the piston shaft.

Background of the invention

The brake assembly of a railroad car, when charged, is actuated by an automatic control valve which operates to connect the compressed air reservoir of the brake cylinder whenever the supply of compressed air to the control valve is reduced in pressure or eliminated. This causes the brake cylinder piston to extend until it is resisted by the brake assembly thereby applying the brake. To release the brake the system must be bled off manually or the supply of compressed air to the control valve restored to its original pressure. The only other means for actuating the brake system of a railroad car is by manual means. No locking means are provided for railroad cars to prevent the brake assembly from being applied.

Generally, when the brake system of a railroad car is to be repaired, the repairman is required to release the compressed air from the reservoir so that the brake cylinder piston is retracted to its furthest position. To perform this work the railroad car is generally placed on a siding or in a repair area and isolated from other cars. After the work is completed he is required to charge the system with compressed air and to test the brakes. If further work is required the entire procedure for releasing and charging the compressed air is repeated. Often accidents will occur when repairmen fail to inactivate the brake system of a railroad car being repaired, principally when the brake system is caused to operate through an emergency that may arise. Further, when conditions require that a railroad car with sticking brakes be continued in a train movement, the repairman is required to isolate the compressed air supply to the railroad car with sticking brakes from the rest of the train so that the remaining portion of the train will maintain operation of the braking system. By proper manipulation of valves controlling the compressed air supply the necessary repairs on a particular car may be completed without disconnecting it or isolating it from the rest of the train. Even when this procedure is employed the brake system of the isolated railroad car can be actuated thereby endangering repairmen working on the car since there is no positive locking means for preventing the application of the brake assembly.

When railroad cars are switched, for example, to form trains at humping stations in railroad yards, the cars are switched without a continuous supply of air pressure to the brake assembly. This requires that a repairman release the compressed air from the brake cylinder and generally from the compressed air reservoir to the brake cylinder assembly. Also, when repair work requiring jacking of the car is being performed, such as repacking of journal boxes or replacement of wheels or the like, a re-

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pairman for testing the air brake system must stand by until the work is completed before testing the air brake system for defects, for example, leaks. There are no devices that may be employed for locking the brake cylinder assembly while repairmen are performing work on a railroad car or no positive locking means for locking the brake assembly while switching the cars.

Summary of the invention

In accordance with the present invention, I have found a means for locking the brake assembly of railroad cars by manually mounting a locking device which is positive in action for restraining any movement of the brake piston which actuates the brake assembly. The locking mechanism comprises at least a restraining arm for attachment to the outer casing of the brake cylinder and means integrally formed with the restraining arm for immobilizing the brake piston from forward movement.

Description of the drawings

In the accompanying drawings:

FIG. 1 is a fragmentary view of the outer casing of the brake cylinder in which the side elevation view of the lock mechanism is shown mounted thereon;

FIG. 2 is an end elevational view in the direction along the arrow 2 of FIG. 1;

FIG. 3 is an enlarged fragmentary sectional view of a portion of the lock mechanism restraining the brake piston along the arrows 3—3 of FIG. 2;

FIG. 4 is an alternate form of a pressure plate employed as a part of the lock mechanism; and

FIG. 5 is a sectional view of FIG. 4 in the direction of the arrows 5—5 of FIG. 4.

In the drawings, a portion of the brake cylinder assembly 10 for railroad cars is illustrated. The brake cylinder assembly comprises a piston cylinder 12, a piston shaft 14 integrally formed with the piston head, not shown, and push rod 16 which is connected to the mechanical linkage of the brake assembly for railroad cars, not shown. Push rod 16 is telescopically positioned within piston shaft 14 so that as the piston shaft moves forward or outwardly from the piston cylinder the push rod is also forced forward thereby actuating the brake assembly.

A cone shaped sleeve 20 is mounted at the open end of piston cylinder 12 so as to minimize the collection of dirt, cinders, of the like, within the brake cylinder during use. The outer end portion 15 of piston shaft 14 is flanged so as to cover the forward opening of conical sleeve 20.

Locking mechanism 30, as seen in FIGS. 1 and 2 mounted to the brake cylinder assembly, is in the form of a U bracket preferably having a pair of outwardly extending restraining arms 32 and 34, the outer ends of which are curved inwardly so as to form hooks 33 and 35. Preferably the opening formed at the end of the restraining arms is slightly smaller than the diameter of the flange of the brake cylinder so as to insure engagement of hooks 33 and 35 with the flange of the brake cylinder, as shown in FIG. 2. Also, a chain, not shown may be mounted on the restraining arms 32 and 34 adjacent hooks 33 and 35 so as to insure that locking mechanism 30 will be mounted in position so that hooks 33 and 35 are positioned behind the flange of the brake cylinder.

At the base 38 of the U bracket means a member is rigidly mounted thereon which is generally in the form of a wedge 36 with its point extending inwardly toward the opening formed between the restraining arms. As seen in FIG. 3, base 38 of locking mechanism 30 rests on the upper surface of push rod 16 and wedge 36 is positioned between the inner surface of piston shaft 14 and the outer surface of push rod 16. When locking mechanism 30 is mounted in position, as shown in FIGS. 1-3, any

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movement of the piston shaft 14 will cause a pressure through base 38 and often wedge 36 so that a restraining pressure through restraining arms 32 and 34 is applied thereby preventing further outward movement of the piston shaft and push rod which prevents application of the brake assembly for the railroad car.

If desired, a plate 40 may be provided with lock mechanism 30. In FIGS. 1-3 one form of a plate is shown in which an elongated member having an opening 42 at one end thereof substantially equal to the diameter of the restraining arm so as to be slidably and rotatably mounted thereon. Along the length thereof an arcuate opening is formed which is complementary to the outer surface of the push rod. As seen in FIG. 3, plate 40 is biased against the outer surface of flange 15 of piston shaft 14 and is prevented from being deformed by rotatable shield members 50 and 52. As seen in dotted lines in FIG. 2, a tie bar 53 is mounted therebetween so that shield bars 50 and 52 will rotate in unison. When employing plate 40 and shield members 50 and 52, accidental damage to the piston shaft is prevented and also the shield members provide a means whereby a force may be impinged against lock mechanism 30, such as by hammering, to mount lock mechanism 30 in position.

Pressure plate 40 serves to protect piston 14 and particularly the flange 15 of piston 14 from damage when lock mechanism is applied to the brake cylinder assembly. This is readily apparent from the drawings since shield members 50 and 52 and base 38 bear against the piston shaft 14 and flange 15 when the locking mechanism is in the locking position. Naturally, since the piston has a tendency to move outwardly, there could be damage to it from locking mechanism 30 in the applied position. With the positioning of plate 40 it can be readily seen how it serves to protect the piston as well as protect shield members 50 and 52 from grooving or roughing from wear and thusly assures even distribution of pressure through continued proper alignment. Furthermore, as described at a later point in this application, when shield members 50 and 52 are positioned in the UP or locking position they are often moved into the UP position by means of a light stroke from a hammer so that the piston is properly positioned in its most recessed point in the brake cylinder. Plate 40 therefore protects the piston from the surfaces of shield members 50 and 52 as it is hammered into position so that damage to the piston cylinder assembly is protected against.

Shield members 50 and 52 serve to permit the adjusting inward of the brake cylinder piston 14 in the event that it is not fully recessed as is frequently the case and as discussed above. A light stroke of a hammer against members 50 and 52 as they are positioned in the UP position will normally place piston shaft 14 into its most recessed position. This is readily apparent from the drawings. Also readily apparent is the fact that the shield members assure the positioning of the restraining arms 32 and 34 as nearly as possible in line with the normal travel of the piston. This is accomplished by providing a constant distance between the inwardly formed curved ends and the piston side of the pressure plate when the lock mechanism is fully and properly applied to the brake cylinder and is in position to restrain the piston. As is readily apparent from FIG. 3, the majority of the mass of members 50 and 52 is below the upper edge of flange 15 and, therefore, the majority of the restraining force will be inwardly toward the piston shaft to hold it in position and therefore the base portion 38 of the locking mechanism 30 will not be able to be displaced in the upward direction which would free piston shaft 14. Therefore, when shield members 50 and 52 are in the UP position lock mechanism 30 will be substantially aligned with piston 14 and will retain it in its most recessed position as shown in the drawings.

As seen in FIGS. 4 and 5, an alternate form of plate 40 is shown. Plate 56 is generally semi-circular and is

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provided with an arcuate opening 58 similar in shape to the arcuate opening formed in plate 40, previously described. Plate 56, for convenience, is mounted to the locking mechanism 30 by chain 60 which is mounted on one of the restraining arms 32 with the other end of plate 56 as seen in FIG. 4. An arcuate collar 59 is formed along the outer edge of plate 56, as shown in FIGS. 4 and 5, to facilitate mounting between the shield members in a similar manner as shown in FIG. 3.

Description of the preferred embodiments

In operation, lock mechanism 30 is mounted to the brake cylinder assembly 10 so that hooks 33 and 35 nest behind the flange of the brake cylinder, as seen in FIG. 2, with the wedge-shaped locking means 36 nesting in the annular space between push rod 16 and piston shaft 14. Plate 40 is rotated into position so that the arcuate opening formed therein nests on the top surface of locking means 36. Shield members 50 and 52 are rotated upwardly so as to move piston shaft 14 inward if necessary. Also, where necessary, the repairman may employ a hammer to adjust the piston shaft inward and to adjust lock mechanism 30 in place thereby preventing any damage to the piston shaft or flange thereon. When lock mechanism 30 is so mounted, substantially no movement of brake cylinder piston may occur, for example, as a result of operation of the emergency brake assembly.

In accordance with my invention, a positive lock mechanism is provided which insures the safety of workmen and reduces to an absolute minimum injury to workmen due to accidental application of the brake system. The unit is portable, inexpensive and easily manufactured. Further, lock mechanism 30 may be employed not only where railroad cars are being repaired in a railroad yard, but while the railroad car is attached to other railroad cars. By use of such a locking mechanism, individual railroad cars can be isolated from others without disengaging the car from other cars or without bleeding or exhausting the compressed air from an individual railroad car or from several cars.

A lock mechanism of the type described herein is preferably manufactured of iron or steel with the restraining arms integrally formed with the base portion. The lock mechanism 36 may be forged and welded at the midpoint between the ends of the base portion or it may be formed having a bore at the base thereof and welded in position. Similarly, shield members 50 and 52 may be formed having an opening at the base thereof or the opening may be formed by bending a piece of metal around the base of the locking mechanism and welded to the extending arm of the shield. It is important that shield members 50 and 52 be rotatable. In any event, the lock mechanism should be made of a material which will withstand maximum pressures exerted by a brake system for railroad cars.

Further, the device may be mounted as equipment on a railroad car so that it may be applied to a brake cylinder by the operator of a train, either manually or automatically, where suitable means are employed for mounting the lock mechanism to the brake cylinder assembly for railroad cars.

It is apparent that a lock mechanism of this type may be employed for positive locking the movement of a piston and piston cylinder in which appropriate locking means is formed thereon.

I claim:

1. A portable locking mechanism in combination with a brake cylinder assembly of a railroad car, said assembly including a piston cylinder, locking mechanism engaging means on said cylinder, a piston shaft and a push rod with said push rod and piston shaft mounted on said piston cylinder so as to be movable in unison with respect thereto, said locking mechanism comprising: at least one restraining arm having means at one end abutting said locking mechanism engaging means on said cylinder for

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removably mounting said arm to said brake cylinder assembly and a base portion at the other end thereof for removably mounting said arm to said piston shaft and push rod, and lock means mounted on said base abutting said piston shaft for immobilizing forward movement of the piston shaft and push rod with respect to said piston cylinder thereby forming a positive lock to prevent accidental application of the air brake assembly and providing a locking mechanism which may be readily and rapidly mounted on a brake cylinder assembly and readily dismounted so that an assembly can be quickly, efficiently and safely repaired.

2. A locking mechanism as set forth in claim 1 wherein said locking mechanism includes a pair of restraining arms extending outwardly from opposed ends of said base and said means at said one end of each arm being an inwardly formed curved portion so as to engage said piston cylinder.

3. A locking mechanism as set forth in claim 1 wherein said locking means includes a wedge rigidly mounted to the base portion and extending in the direction of the plane of the outwardly extending arms, and said base portion positioned adjacent said piston shaft with the wedge between the piston shaft and the push rod.

4. A locking mechanism as set forth in claim 1 wherein a pressure plate is rotatably mounted on said locking mechanism adapted to be positioned between the outer surface of the brake cylinder piston shaft and the base of the locking mechanism.

5. A locking mechanism as set forth in claim 1 wherein a shield member is rotatably mounted on the base portion of the locking mechanism.

6. A portable locking mechanism in combination with a brake cylinder assembly of a railroad car, said assembly including a piston cylinder, locking mechanism engaging means on said cylinder, a piston shaft and a push rod with said push rod and piston shaft mounted on said piston cylinder so as to be movable in unison with respect thereto, said locking mechanism comprising: a U bracket having a base portion for removably mounting said bracket to said piston shaft and push rod and outwardly extending therefrom a pair of restraining arms formed with means at the ends thereof abutting said locking mechanism en-

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gaging means on said cylinder for removably mounting said bracket to the brake cylinder and lock means mounted on the base of the U bracket abutting said piston shaft for immobilizing the forward movement of the brake piston rod thereby forming a positive lock to prevent accidental application of the air brake assembly for railroad cars.

7. A locking mechanism as set forth in claim 6 wherein said locking means includes a wedge rigidly mounted to the base portion and extending in the direction of the plane of said outwardly extending arms, and said base portion positioned adjacent said piston shaft with the wedge between the piston shaft and the push rod.

8. A locking mechanism as set forth in claim 6 wherein a pressure plate is rotatably mounted on said locking mechanism adapted to be positioned between the outer surface of the brake cylinder piston shaft and the base of the locking mechanism.

9. A locking mechanism as set forth in claim 6 wherein a shield member is rotatably mounted on the base portion of the locking mechanism.

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