Nov. 29, 1955 D. W. LOWE 2,725,121

RAILROAD CAR IMPACT RETARDER

Filed June 25, 1954 2 Sheets-Sheet 1

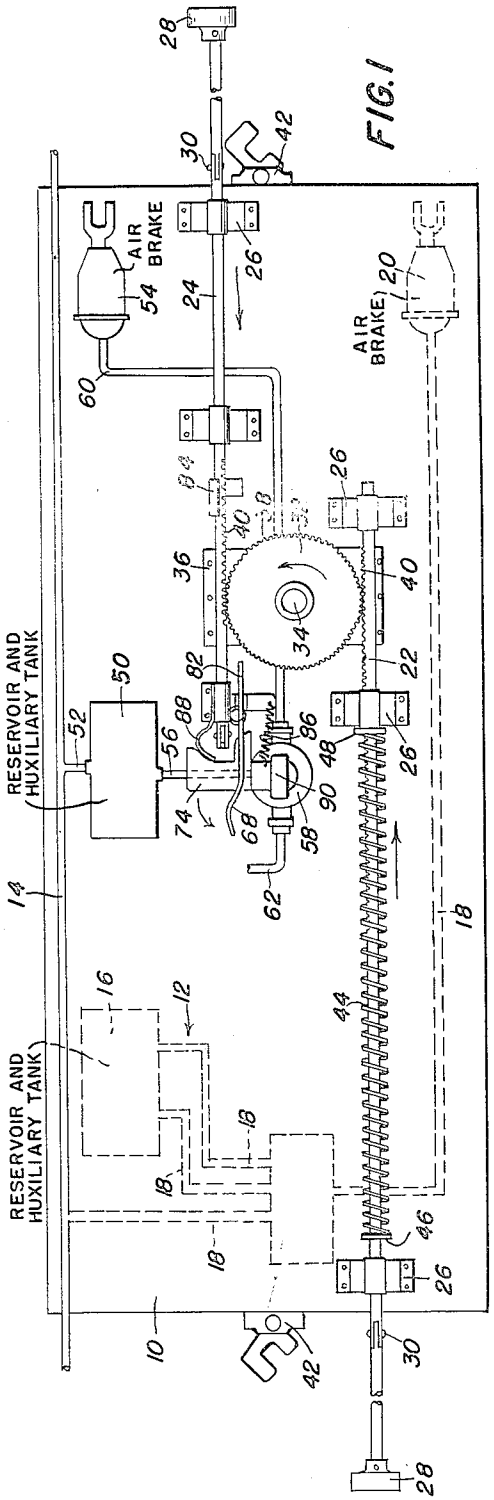


FIG. 1

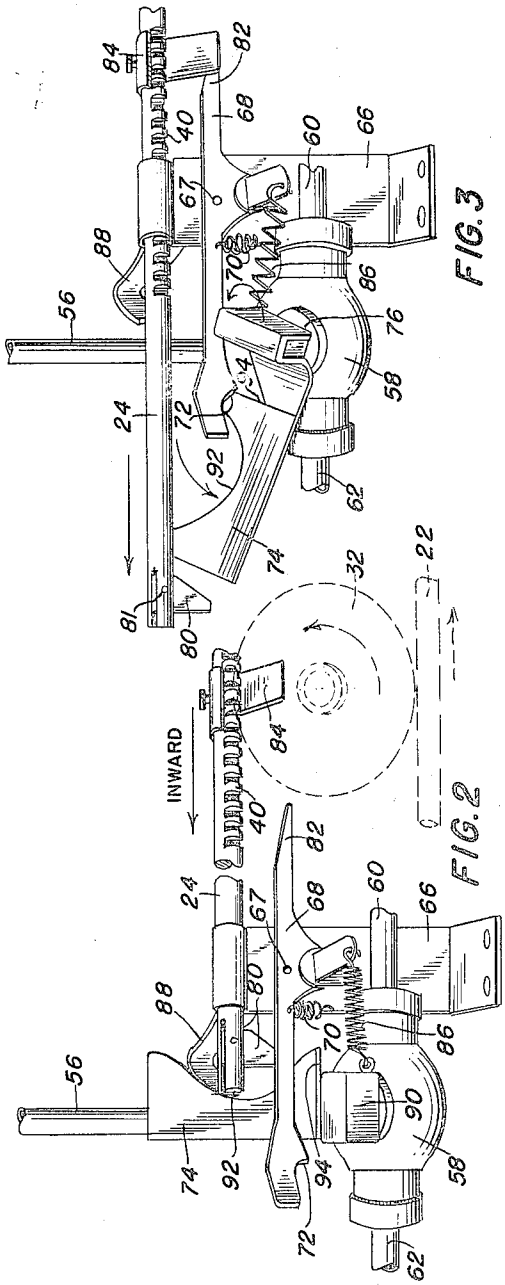


FIG. 2

FIG. 3

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RAILROAD CAR IMPACT RETARDER

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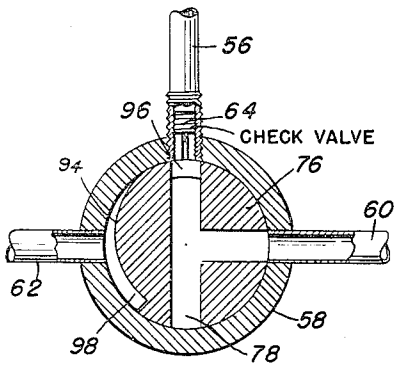


FIG.4

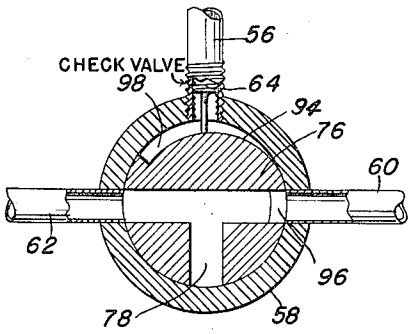


FIG.5

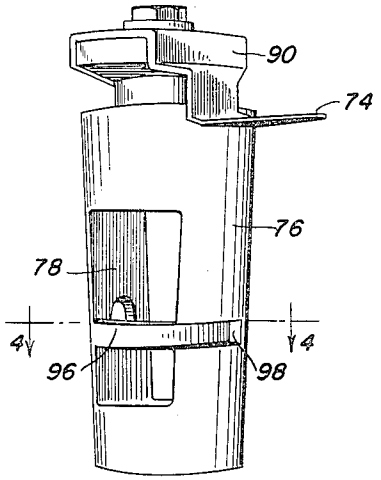


FIG.6

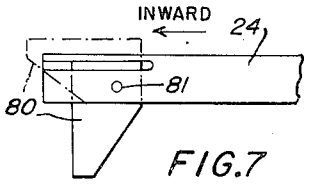


FIG.7

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RAILROAD CAR IMPACT RETARDER

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5 Claims. (Cl. 188—148)

This invention relates to a railway car impact retarder.

In particular my invention relates to a device which retards a free rolling railway car by applying the conventional air brake mechanism of the car and upon the further retarded rolling movement thereof the brake is released.

When making up a railroad train in a switch yard there is much damage and abuse done to the cars and contents thereof by the impact created when one car bumps against another car. One method used in freight yards to make up the trains is commonly called "humping" and requires that a railway car roll freely down an incline grade and come to rest by impact against a stationary car. Consequently there occurs considerable damage to the moving and stationary cars and their contents since the freely rolling car is moving at approximately eight to ten miles per hour.

Such a method of making up a train as described above is a time-saving and efficient operation in all respects except for the damage and wear had to the cars and their contents by the sudden stoppage of one car by another car.

Further my novel railway car impact retarder operates efficiently on all rolling railway cars whether it is a "humping" operation or one of the more conventional methods of switching and/or other methods of making up a train.

It is, therefore, a primary object of this invention to provide a device which retards the movement of a rolling railway car prior to the contact of the car with a stationary car.

It is a further object of this invention to provide a freely rolling railway car with an impact retarding device which when the car is retarded the further movement thereof actuates a device to release the brakes and allow the car to come to a slowly rolling stop and make a gentle coupling with the stationary car.

It is a further object of this invention to provide railway cars with an impact retarder which is highly efficient in operation, low in cost of maintenance, easily assembled and secured to a standard railway car, adapted to be used with standard equipment and inexpensive to manufacture.

All of the foregoing and still further objects and advantages of the invention will become apparent from a study of the following specification, taken in connection with the accompanying drawing wherein like characters of reference designate corresponding parts throughout the several views, and wherein:

Fig. 1 is a plan view of the bottom of a railroad car showing my impact retarder mechanism secured thereto in operative relation therewith;

Fig. 2 is an isometric view of the valve opening and closing mechanism showing the valve closed and the opening element in contact therewith an instant before the valve is opened;

Fig. 3 is a view similar to Fig. 2 but shows the valve in open position and being held in such position by the

holding element an instant prior to the release of the valve to its closed position;

Fig. 4 is a sectional view of the valve of my impact retarder, on the plane 4—4 of Figure 6, showing the valve plug in open position;

Fig. 5 is a section similar to Fig. 4 showing the valve plug in closed position;

Fig. 6 is an isometric view of the valve plug; and

Fig. 7 is an enlarged view of the valve opening element showing such element in two positions.

Referring more specifically to the drawings, and in particular to Fig. 1 wherein there is shown a railway car **10** having mounted thereon a conventional type air brake system **12** comprising a main air train line **14**, reservoir and auxiliary tank **16**, conduits **18** and A—B cylinder **20** for the actuation of the brakes of the car **10**.

There is further shown in Fig. 1 the structure which constitutes my invention comprising two parallel disposed longitudinally extending contact rods **22** and **24** which are mounted on the bottom of the car **10** by brackets **26** or the like for longitudinal sliding movement in relation to the car. Each of the rods **22**, **24** is provided with universally mounted contact elements **28**, the specific construction of which forms no part of this invention. Intermediate the contact elements **28** and the end of the box car **10** there is provided a hinge **30** for each rod **22**, **24** which allows the outer end of each rod to be raised to an out-of-the-way position and secured therein should my impact retarder not be in use. The hinge **30** forms no part of this invention and the specific details thereof will not be described. However, it should be mentioned that the hinge **30** provides for movement in only one direction and is provided with portions which allow the rod to be rigid when in operative position, as shown in Fig. 1.

Intermediate the inner ends of the rods **22** and **24** there is provided an idler gear or wheel **32** horizontally disposed and rotatably mounted on the car **10** by means of a shaft **34** secured to the bracket **36**. The peripheral edge of the idler gear **32** is provided with a series of teeth **38** which make contact with a series of longitudinally extending teeth **40** on each of the rods **22** and **24**. This provides in the nature of a rack and pinion mechanism to give similar operative movement to each of the contact rods **22** and **24**, i. e. to provide for both rods to be moving simultaneously at the same rate of speed either longitudinally inwardly or outwardly.

As shown in Fig. 1 the contact rods are in a longitudinally extended position which is the normal position for my impact retarder. In such normal operative position the contact elements **28** extend longitudinally approximately three feet beyond the standard draft gear coupling means **42**. The contact rods are held and retained in such normal operative position by means of a compression spring **44** which is disposed in longitudinal arrangement with the rod **22** and contacts a flange **46** secured thereon and to a second flange **48** secured to one of the brackets **26**.

Thus it is readily seen that the spring **44** urges the contact rod **22** longitudinally outwardly and through the idler gear **32** the other rod **24** is also urged longitudinally outwardly.

There is further shown in Fig. 1 a second reserve and auxiliary tank **50** connected to the main or train line **14** by conduit **52**. The second reserve and auxiliary tank **50** actuates a second A—B cylinder **54** through a conduit **56**, valve **58** and conduit **60**. There is further provided a conduit **62** from the valve **58** which is open to the atmosphere. There is provided in the conduit **56** a one-way check valve **64**, see Figs. 4 and 5, which is disposed intermediate the reservoir and auxiliary tank **50** and immediately adjacent the valve **58**. The purpose of this

one-way valve is to provide a seal in order to close the conduit 56 and retain the pressure in the reservoir and auxiliary tank 50 when the valve 58 is in its closed position, as shown in Fig. 5. The means which is provided to open the one-way check valve 64 will be discussed in more detail later.

Attention is now directed to Figs. 2 and 3 wherein it should be noted that the bracket 66 which supports the longitudinal inner end of the contact rod 24 has pivotally secured thereto, by a pivot pin 67, a catch and release lever 68. The catch and release lever 68 is pivoted intermediate its ends and is spring-biased upwardly by tension spring 70. The left hand end portion, as shown in Figs. 2 and 3, of the lever 68 is provided with an offset catch flange 72 which you will note by reference to Fig. 3 engages and retains the pivot arm 74 of the valve plug 76 after the valve has been rotated to its open position by the longitudinal inward movement of the contact rod 24, the inner end of which is provided with a valve opening element 80 pivotally secured thereto by a pin 81. It should be noted, Fig. 7, that the valve opening element 80 is pivoted in such a manner that it will not pivot when the contact rod 24 is being urged inwardly, as shown by the solid lines in Fig. 7, but will pivot when the contact rod 24 is returning to its normal operative position, as shown by the dotted lines in Fig. 7, so that the inner end of the rod 24 will pass over the pivot arm 74 and the element 80 will be in a position to engage the arm 74 at a future time.

The longitudinal outer end of the lever 68 is tapered to a point providing a release means 82 which comes into contact with a lug 84 carried by the rod 24. When the lug 84 contacts the tapered release means 82 of the pivoted lever 68 it rotates the lever clockwise so that the catch flange 72 releases the valve pivot arm 74 and tension spring 86 returns the valve to a closed position. When the valve is returned to this closed position the pivot arm 74 comes in contact with the stop means 88 which is secured to the bracket 66. It is to be noted that the pivot arm 74 is permanently secured to the valve plug 76 by the U-shaped flange member 90. The pivot arm 74 has a curved surface 92, the outer portion of which provides for contact with the stop means 88, and the inner portion of the curved surface 92 provides for contact of the pivoted valve opening element 80. The radial inner side of the arm 74 is provided with a flat straight surface 94 which engages the catch flange 72 of the pivoted lever 68.

It is to be understood that such elements as the flanges 46, 48, and lug 84 are removably and adjustably secured to the contact rods since the adjustment of these two elements is necessary at various times, and upon repair of a broken rod etc. the removal of these elements would be necessary.

Attention is directed to Figs. 4, 5 and 6 wherein there is specifically shown my valve 58 and novel valve plug 76 having a Y-shaped opening 78 therein. The valve as shown in Fig. 4 is in the open position and it should be noted that the valve plug 76 is provided with a cam surface 94 which has a portion 96 thereof extending into the opening 78 of the plug 76 to provide for the opening of the one-way check valve 64. The cam surface portion 96 is disposed so that when the valve plug 76 is in its open position, Fig. 4, the cam surface portion 96 comes in contact with the stem of the one-way check valve 64 thereby opening the check valve 64. When the plug 76 is rotated to its closed position, see Fig. 5, the conduit 60 is in communication with the conduit 62 and exhausts to the atmosphere, while the groove 98 in the plug 76 allows for the stem of the one-way check valve 64 to be free from any contact with the cam surface 94 of the plug, thus closing the check valve 64. By having a one-way check valve 64 disposed as disclosed there is provided the assurance that there will be no escape of air from the auxiliary and reservoir tank 50 when the valve 58 is in its closed position, since the valve 58 is normally closed and is only in its open position for very short intervals throughout the use of the railway car. It is readily understood that such a check valve is advantageous to the operation of my impact retarder since it is difficult to have a valve with a rotary plug which guarantees an absolute seal.

Having thus described the various elements of my railway car impact retarder I shall now describe the operation thereof, and attention is drawn to Figs. 1 and 2 wherein there is shown the box car 10 having the longitudinally extending contact rods 22 and 24 in normal operative position. When the car 10 is put into free rolling movement in the switch yard it is moving toward a car or group of cars which are stationary at a speed of approximately 10 to 12 miles per hour. The universal contact elements 28 extend longitudinally beyond the coupling means 42 and come into contact with the stationary car approximately three feet before the car would make its normal abrupt contact therewith. When the contact with the stationary car and rolling car takes place the rod 22 or 24, depending upon which way the car is moving, is urged longitudinally inwardly. The pivoted valve opening element 80 contacts the valve pivot arm 74 and opens the valve 58. As the pivot arm 74 is urged to its open position by the element 80 the radial inner flat surface 94 of the arm 74 comes in contact with the catch flange 72 of the lever 68, and since the lever 68 is being biased upwardly by the spring 70 which is on the same side of the pivot point of the lever 68, the catch flange 72 retains the pivot arm 74 in open position and the conduit lines 56 and 60 are in communication with each other through opening 78 of valve 58 and air pressure from the tank 50 is applied to the A—B cylinder 54 to apply the brakes simultaneously with the contact of the rod against the stationary car. It is to be noted that the brake actuation of my impact retarder is through positive pressure from the tank 50.

At this point it should be noted that the rods 22 and 24 are not at their maximum longitudinal inward position. The brakes having been set the car is immediately retarded but the inertia thereof will carry it slightly forward at a slower free rolling speed. The rods 22 and 24 will therefore be urged further inward until the lug 84 contacts the curved release means 82 of the lever 68. The curved surface of release means 82 is disposed so that when the lug 84 continues longitudinally inwardly the force of the spring 70 is overcome and the smooth surface 94 of the arm 74 is released from the catch flange 72 and the spring 86 returns the arm 74 to the closed position. The arm 74 makes contact with the stop means 88 and the brakes are at that time released since the valve 58 has returned to its closed position as shown in Figure 5. It will be obvious that the motion of the railway car when the brake is applied will be a reduction of speed and a short period thereafter the brake will be released which will allow for a very slow free rolling movement of the car in order for the automatic coupling means 42 to operate to secure the rolling car to the stationary car.

It will be appreciated that my impact retarder will provide for the assurance that the rolling car will not make an abrupt and damaging contact with the stationary car but will retard the rolling car sufficiently to prevent any damage to it or its contents and further will allow for the rolling car to make an automatic coupling with the stationary car.

It is believed that the many advantages of the impact retarder for railway cars constructed in accordance with the present invention will be readily understood and although the preferred embodiment of the invention is as illustrated and described, it is to be understood that changes in the details of construction and in the combination and arrangement of parts may be resorted to which will fall within the scope of the invention as claimed.

What I claim is:

1. In a railway car having an automatic braking system, a means carried thereon to retard the free rolling movement thereof by first automatically applying the brakes thereto and subsequently automatically releasing the brakes, said means comprising a source of fluid under pressure, a brake actuating means, conduit means connecting said source of fluid to said brake actuating means, a regulating valve means in said conduit means controlling the flow of said fluid therethrough, contact means slidably mounted to the car and adapted to be longitudinally positioned between an outer extended normal position an intermediate position and an inner position by contact with an external object, a valve actuating means secured adjacent the inner end of said contact means and adapted to open said regulating valve means when said contact means is urged to said intermediate position, a valve closing means secured to said contact means and adapted to close said regulating valve means when said contact means is urged to said inner position, and means to return said contact means to the outer extended normal position.

2. The structure defined in claim 1, wherein a check valve means is disposed in said conduit means intermediate said valve source and said regulating valve.

3. The structure defined in claim 2, wherein there is provided a check valve opening and closing means on said regulating valve means to automatically open said check valve means when said regulating valve means is actuated to said open position and to automatically close said check valve means when said regulating valve means is actuated to said closed position.

4. The structure defined in claim 1, wherein said contact means comprises a pair of parallel disposed rods, one end of each rod extending beyond opposite ends of the car when said contact means is in said outer extended normal position, said rod ends being adapted to make contact with an object to actuate said rods to said intermediate and inner positions.

5. In a railway car having an automatic braking system, a means carried thereon to retard the free rolling movement thereof by first automatically applying the brakes thereto and subsequently automatically releasing the brakes, said means comprising a source of fluid under pressure, a brake actuating means, conduit means connecting said source of fluid to said brake actuating means, a regulating valve means in said conduit means controlling the flow of said fluid therethrough, a check valve means in said conduit means intermediate said fluid source and said regulating valve, check valve opening and closing means to automatically open and close said check valve in accordance with the flow of fluid through said regulating valve, contact means including a pair of parallel disposed longitudinally slidable rods carried by the car and adapted to be longitudinally positioned with respect to the ends of the car between an outer extended normal position an intermediate position and an inner position, one end of each rod extending longitudinally beyond opposite ends of the car when said contact means is in said outer extended normal position, said rod ends being adapted to make contact with an object to actuate said rods to said intermediate and inner positions, a means interposed between said rods to give similar operative movement to each rod, a valve actuating means secured to the inner end of one of said rods and positioned to open said regulating valve means when said rods are longitudinally urged to said intermediate position, a valve closing means secured to said one rod and positioned to close said regulating valve means when said rods are further longitudinally urged to said inner position and means to return said rods to the outer extended normal position.

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