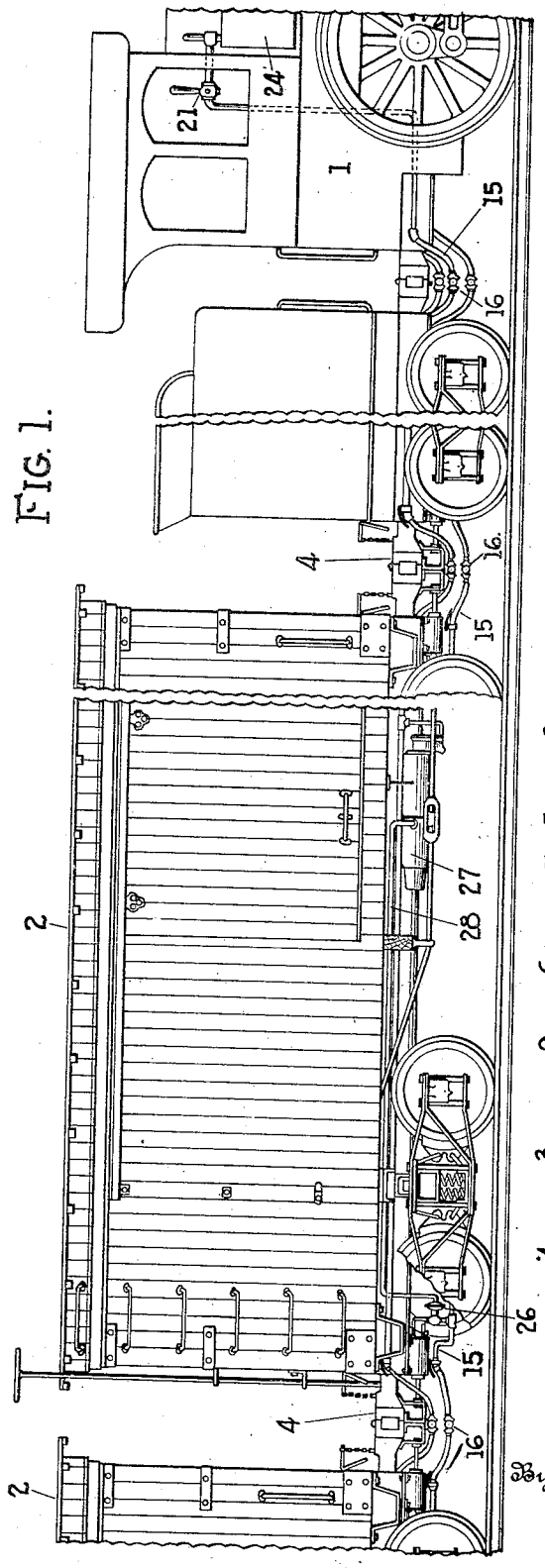
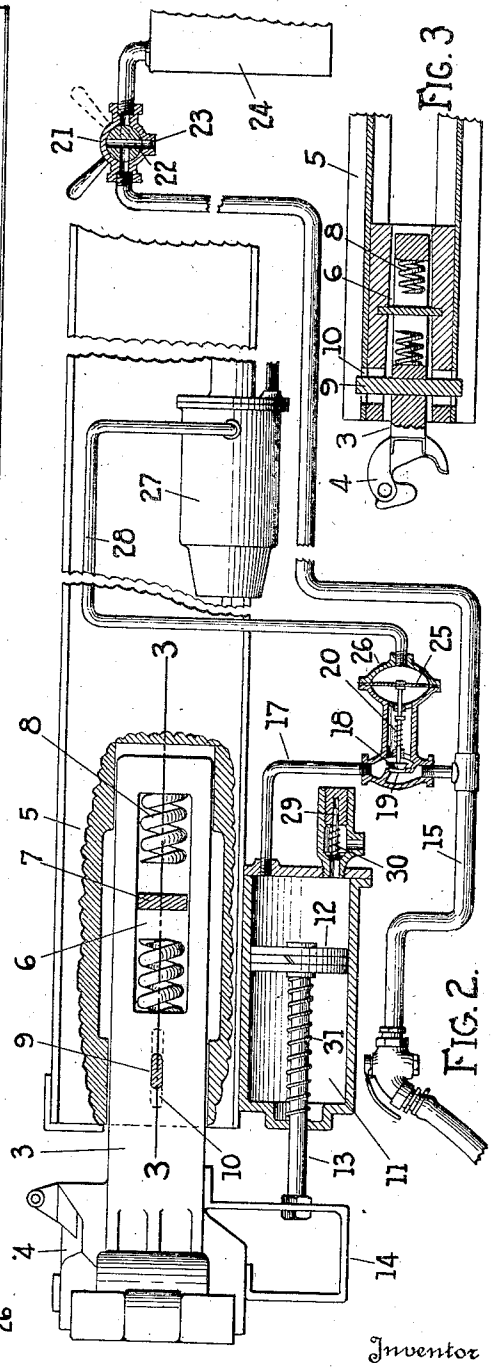
Feb. 18, 1930. W. COYLE 1,747,226

DRAWBAR AND SLACK CONTROL FOR TRAINS

Filed July 26, 1928





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Patented Feb. 18, 1930 1,747,226

UNITED STATES PATENT OFFICE

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DRAWBAR AND SLACK CONTROL FOR TRAINS

Application filed July 26, 1928. Serial No. 295,512.

This invention relates to slack controlling means for trains and one feature of the invention is the provision of air operated means for operating the draw bars of the various cars constituting a train for taking up or releasing the slack therebetween.

A primary feature of the invention is the provision of a control means in the cab of the engine whereby the slack control means may be operated the entire length of the train by the trainmen in the cab.

A further feature of the invention is the provision of means for automatically retaining a quantity of air for providing a cushion to retard the impact between the draw bars, as when the cars are accidentally uncoupled in a moving train.

A further feature of the invention is the provision of a valve adapted to be closed for temporarily retaining the air in the slack takeup means, in the event of the uncoupling of the cars and setting of the brakes thereon.

Other objects and advantages will be hereinafter more fully set forth and pointed out in the accompanying specification.

In the accompanying drawing which is made a part of this application,

Figure 1 is an elevation of a portion of a train, parts being broke out.

Figure 2 is a fragmentary sectional and diagrammatic view of the slack controlling mechanism, and,

Figure 3 is a horizontal sectional view through a conventional draw bar with which the invention is embodied, as seen on line 3—3, Fig. 2.

Referring to the drawing, the numeral 1 indicates a locomotive and 2, the cars drawn thereby, in this instance freight carrying or box cars, said locomotive and cars being of the conventional variety. The locomotive and each car are provided with draw bars 3, having coupling heads 4 at their outer ends, said draw bars being connected to their respective elements in the approved manner, preferably slidable in a frame 5, the shank of the draw bar having an elongated slot 6 therethrough which is intersected by a partition 7 fixed to the frame 5. The usual form of bumpers are placed in the slot 6 on opposite sides of the partition 7, preferably coiled sections of springs 8, which receive and cushion the impact of the blows incident to the slack movements of the various cars in relation to each other constituting the train. The longitudinal movement of the draw bars is limited by means of a cross bar 9 carried by the draw bar and having its ends entered in elongated slots 10 in the frame 5.

Heretofore, considerable difficulty has been encountered by pulling out one or more draw bars of a train, especially when a long string of cars constitute the train, as the locomotive and forward cars have picked up considerable momentum before the pull is imparted to the rearmost cars, and if the draw bars are in slack position, an extremely hard jerk is imparted to the latter draw bars, with the result that in many instances one or more draw bars are pulled loose from the cars, incident to such sudden hard pull directed thereagainst.

In some instances this difficulty occurs in drawing a train over a road which is up and down grade, at comparatively close intervals. For example, when the train has been traveling down grade and suddenly starts up grade, the front end of the train will be retarded while the rear end is still traveling down grade under which conditions the rear end cars crowd forward and take up the slack substantially throughout the train. If the up grade is comparatively short, the head end of the train will pass over same and in many instances start down grade again immediately, and will gain speed rapidly over the rear end cars, it being understood that the slack is taken up between the rear cars of the train last. By this time the front end of the train is traveling at a much more rapid speed than the rearward cars and the slack between these rear cars will be thus taken up with a quick jerk which often results in pulling the draw bar mechanism apart from one of these rear cars and thus breaking the train.

In other instances even where the train is running on a level track and it is found necessary to partly or entirely close the engine throttle to lessen the speed of the train, it is a fact well known to those familiar with the art that the train proper drifts along at a

higher speed than the engine. This causes a slack to be taken up between the cars toward the head end of the train first, and as the rear end follows up in closing the slack, the impact of the cars is felt against the more forward cars and the head end of the train is thus bumped along and travels for a short period of time faster than the rear end, which causes the slack to be again open throughout most of the train and the cars toward the rear thereof would be again subjected to a severe jerk which results in many instances in pulling the draw bar mechanism apart from the car.

It will be therefore understood that under the above described conditions and circumstances that a draw bar mechanism of one of the cars of the train will be pulled loose, making an expensive repair necessary, and tying up the business of the railroad temporarily.

With this in mind, I have provided means for de-slacking the various draw bars throughout the train as desired so that the pull strain will be imparted to all of the cars of the train uniformly and without sudden and violent jerks usually caused by the taking up of slack at the draw bars. The means I have for thus eliminating this slack when desired consists of a cylinder 11, which is attached to the base of the cars 2 at each end thereof and preferably at a point immediately beneath the draw bar 3. A piston 12 is reciprocally mounted in the cylinder 11, the piston rod 13 thereof extending through the outward end wall of said cylinder and having its outer end fixed to a bracket 14 depending from the coupling head 4. A cylinder 11 is embodied with each draw bar, there being two to each of the cars 2, or one at each end thereof and the pistons therein forced outwardly by means of compressed air, which is conveyed into the cylinders through a pipe line 15, extending from the locomotive throughout the train to the last car so that the pipe line may be made continuous throughout the length of the train. The main line 15 is connected in each instance with a cylinder 11 by a branch line 17, and intersecting said branch line is an automatic valve, 18, normally held away from its seat 19 by means of a spring 20, so that air will freely pass through the branch line 17. By operating the throttle 21 in the engine cab, which is a part of the pipe line 15, the engineer can take up the slack throughout the length of the train by merely turning the throttle in one direction or release the air from all the cylinders 11, by turning the throttle to another position as indicated by full and dotted lines in Fig. 2, the position of the parts indicated by the full lines placing the port 22 of the throttle in registration with the escape port 23 for releasing the air from the cylinders while the turning of the throttle to the position indicated by the dotted lines will register the port 22 with the air storage tank 24 and the main line 15, for operating the pistons 12.

The stem of the valve 18 is attached at its outer end to a diaphragm means 25 so that by directing air pressure against said diaphragm, the valve may be forced to closed position for holding such air as may be within the cylinder against escaping. The housing 26 within which the diaphragm is enclosed is connected to the air cylinder 27 of the regular air braking system, by means of a conduit 28, so that in the event the train itself becomes broken and the air pressure in the line 15 being lost when hose couplings 16 are consequently pulled apart, the pressure from the air brake system will operate the diaphragm means 25 and close the valve 18 against its seat 19 in opposition to the spring 20, by which the air within the cylinder 11 will be trapped so that when the broken away part of the train again makes contact with the rest of the train, the draw bar 3 will be cushioned by the piston 12 and save the abutting parts from severe and destructive impact.

In consequence of utilizing the air within the cylinder 11 for cushioning purposes, a check valve 29 is attached to the wall of the cylinder 11 so that a certain amount of air may escape therethrough incident to such compression and thus prevent bursting or injury to the cylinder, owing to the sudden excess pressure therein. The valve 29 is normally held closed by means of a spring 30, and the piston 12 is returned to its initial position, when the air pressure thereagainst is released, by means of a spring 31 surrounding the shaft 13, between the piston and head of the cylinder.

It should be borne in mind, however, that the slack in a train as provided at the draw bars is very essential to train operation for without this slack it would be practically impossible to start a heavy train under ordinary conditions. In starting, the engineer ordinarily backs his engine first, to close the slack throughout most of the train. He then starts the engine forward and the slack allows the engine to pick up suitable momentum to pull the first cars and start them in motion before any great pulling strength is exerted on the rear cars, by which arrangement it will be understood that the engine is enabled to move several feet before the full load of the train is felt, and it is usually this start which the engine gets in advance of the cars of the train which enables the same to be started. For these reasons it is therefore necessary to have slack in the train at certain times and very advantageous to eliminate this slack throughout the train, at other times. For this reason the throttle is provided in the engine cab as above mentioned so that the invention may be used when and as desired by the engineer to eliminate or provide slack throughout the train.

Another very important feature of the invention resides in the fact that in applying the air brakes to stop a train, the brakes are unavoidably applied to the forward cars first, and the slack will take up from the head to the rear end of the train in advance of the action of the air brakes, for which reason the rear cars of the train will be moving at a destructive rate well after the brakes are effective in the front end of the train and the impact between the rearward cars and the forward ones in many instances acts to collapse the draw bar mechanism and sometimes to knock the car truck out of place, and in some instances to knock the cars entirely off the track, and it will therefore be understood that where the slack of the train is taken up by this apparatus before the brakes are applied that the destructive impact at the draw bars will be eliminated when the slack is removed by operation of the throttle valve.

While the description and drawing illustrates in a general way, certain instrumentalities which may be employed in carrying the invention into effect, it is evident that many modifications may be made in the various details, without departing from the scope of the appended claims, it being understood that the invention is not restricted to the particular example herein described.

What I claim is:

1. In a slack take-up for trains, the combination with the draw bar means of one or more cars constituting a train, of a cylinder for each draw bar, a piston for each cylinder and connected to the draw bar means, means for injecting air from a source under pressure into such cylinder for causing the piston to move said draw bar means and remove slack therefrom, an automatic valve intersecting the aforesaid air source for closing the same when desired, an enclosed diaphragm for closing said valve, and means for conducting air from a different source to said diaphragm for actuating the same for closing said valve.

2. In a slack take-up for trains, the combination with the draw bars of the cars of a train, and an air brake system associated with the cars, of a cylinder means for each draw bar, piston means associated with each cylinder means and connected to the draw bar, means for directing air into the cylinder means, means controlled from said air brake system for confining the air in said cylinder, means when the pressure therein has been depleted to a prescribed degree, means for automatically relieving the pressure in the cylinder means, and means in the cab of a locomotive for progressively charging all the cylinders with air or releasing the same therefrom.

3. In a slack control for trains with air brake systems, the combination with the draw bar means of the car, of a piston and cylinder means in conjunction therewith; conduit means for directing air to said piston and cylinder means; pressure actuated valve means forming a part of said conduit means, the actuating mechanism of this valve means being connected to the air brake system of the train whereby the air brake pressure will serve to close said valve means when the air supply to said piston and cylinder means is below a certain pressure.

In testimony whereof, I have hereunto set my hand on this 17th day of July, 1928, A. D.

WALTER COYLE.