July 1, 1958 O. E. SPENCER 2,841,293

RAILROAD CAR CUSHIONING MECHANISM

Filed June 15, 1954

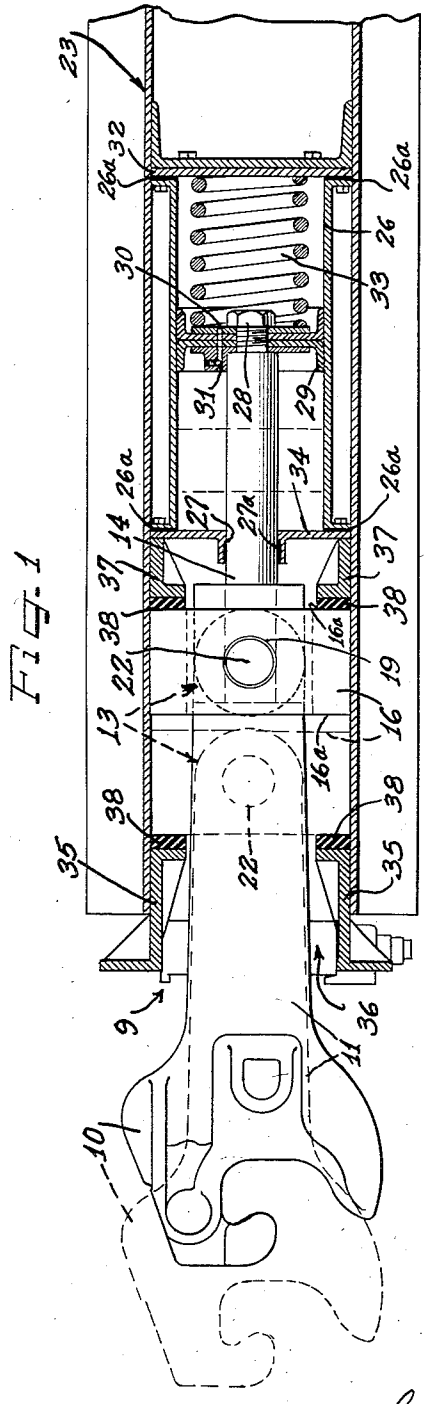


Fig. 1

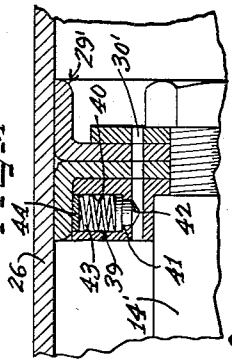


Fig. 4

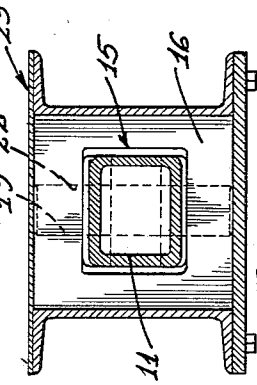


Fig. 3

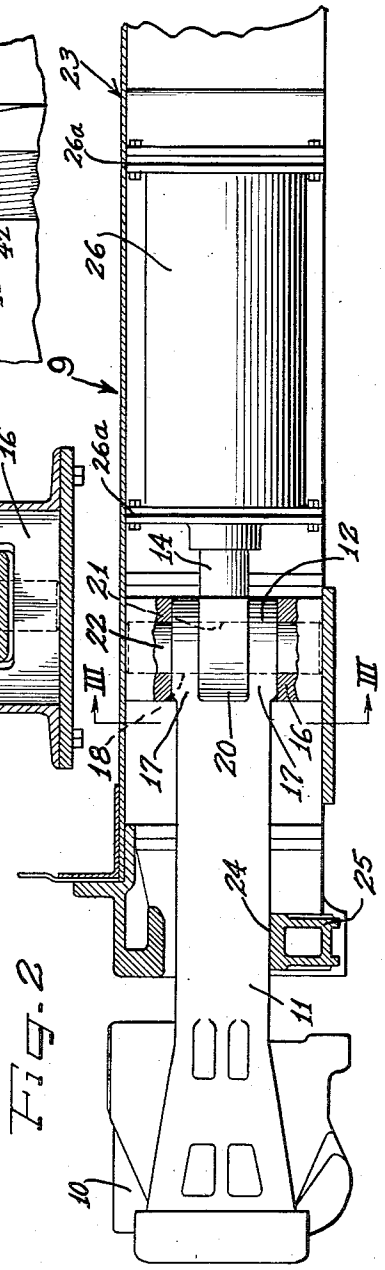


Fig. 2

Inventor
OLIVER E. SPENCER

by Hill, Sherman, Meroni, Gross & Simpson Attys.

United States Patent Office

2,841,293

Patented July 1, 1958

2,841,293

RAILROAD CAR CUSHIONING MECHANISM

Oliver Eugene Spencer, Newton, Kans.

Application June 15, 1954, Serial No. 436,800

9 Claims. (Cl. 213—43)

This invention relates to a railroad car draft gear and more particularly to gearing which embodies composite dampening and buffer mechanism interrelated in a novel way.

In the conventional draft gear, it has been the practice to use cushioning or friction springs for withstanding forces such as impact forces applied to the coupler draw bar. Springs have not always proven to be satisfactory due to variations in manufacture as well as the likelihood of crystallization. In addition, when such springs are used, limit or stop pins are also employed, which are likely to shear off under sudden impact or force.

It will be appreciated that one of the greatest problems confronting railroads in the handling of freight at the present time is damage to cargo by virtue of sudden impact forces due to sudden stopping of freight cars and the like.

Railroad engineers throughout the country are striving to reduce the staggering amounts of such losses.

Hence, one of the main aims of this invention is to provide a draft gear which should be of material assistance in coping with the foregoing serious problem confronting railroads at the present time.

An object of this invention is to provide an improved and more efficient form of railroad car draft gear.

Another object of the invention is to provide a railroad car draft gear which embodies fluid dampening means interrelated in a novel manner with the pivotally supported draw bar.

Still another object of this invention is to provide in a railroad draft gear, limit means for restricting the extent of longitudinal travel of the draw bar in such a manner as to minimize the likelihood of parts shearing and also to minimize the extent of transmission of shock to the car in the event of sudden impact.

Yet, another object of the invention is to provide a railroad car draft gear with cushioning and dampening mechanism of such arrangement with respect to the pivotally supported end of the draw bar as to greatly reduce the likelihood of transmission of injurious shock to the car upon sudden impact forces being applied to the draft bar.

In accordance with the features of this invention, there is provided in a railroad car draft gear, hitching means having a draw bar including a rod, frame means attachable to a car, the rod extending longitudinally of said frame means and supported thereon for movement along a longitudinal path with respect thereto in response to pressure on the hitching means, pivot means on the rod, a guide on and movable with the rod and in slidable cooperation with the frame means, resilient buffer elements supported by the frame means at spaced points along the longitudinal path or travel, and fluid dampening means connected to the rod for dampening its travel along the path to minimize the transmission

of shock to the car upon sudden forces being applied to the hitching means.

In accordance with other general features of this invention, there is provided in a railroad car draft gear including a coupler having a pivotal draw bar and a housing, attachable to the underside of a car, into an open end of which the bar extends for pivotal support therein and which bar is longitudinally movable in the housing in response to pressure on the coupler, the improvement comprising means pivotally supporting the end of the bar in the housing and including a guide slidably engaged with the walls of the housing, spaced resilient buffer elements in said housing on opposite sides of the guide, and fluid dampening means in the housing connected to the block for dampening its movement in either direction prior to its engagement with either of the buffer elements at the extremities of its travel.

Other objects and features of this invention will more fully appear from the following detailed description taken in connection with the accompanying drawings which illustrate a single embodiment thereof and in which:

Figure 1 is a fragmentary plan view partially in cross-section of a draft car cushioning mechanism embodying the features of this invention and showing in dotted lines the normal coupling position of the mechanism;

Figure 2 is a fragmentary side view partially in cross-section of the draft car cushioning mechanism highlighting how the draw bar is pivotally connected to a piston rod within a longitudinally movable guide block;

Figure 3 is an enlarged cross-section view taken substantially on the line III—III of Figure 2 looking in the direction indicated by the arrows; and

Figure 4 is an enlarged fragmentary cross-sectional view showing a modified liquid flow control valve.

As shown on the drawings:

The reference character 9 indicates generally my novel railroad car draft gear. The draft gear 9 is of such construction that it extends longitudinally of the length of the car and may be connected to the same by any suitable means, such as, bolting the same to the transverse and longitudinal sills (not shown) located on the underside of the conventional railroad car.

My novel draft gear 9 has a conventional coupler or hitching means 10 at one of its longitudinal extremities. Integrally connected to the coupler 10 is a draw bar or rod 11 which terminates in a bifurcated end portion 12 which is in turn secured by pivot means designated generally by reference numeral 13 to a piston rod 14.

The pivot means 13 is wholly disposed within cavity 15 located in the central portion of a block or guide 16 (Figure 3) which embodies important features of this invention.

Referring now more specifically to the pivot means 13 (Figure 2), it will be seen that each of the respective prongs 17—17 constituting the bifurcated end portion 12 is vertically apertured at 18. Figure 3 shows how the block 16 is vertically apertured at 19. Similarly, terminal end 20 of the piston rod 14 is apertured at 21 so that when the terminal end 20 is internested between the prongs 17—17, the respective apertures 18 and 21 of the draw bar and piston rod are vertically axially aligned with the aperture 19 of the block 16 in order to receive therethrough pivot pin 22 serving to fixedly secure the block 16 with relation to the bar 11 and rod 14.

By reason of this novel interconnection of parts, the draw bar 11 may pivot about the pivot pin 22, in response to transverse variations of force applied on and through the coupler 10 such as are encountered in the usual railroad car coupler.

This novel interconnection has a further function in allowing the draw bar **11**, the piston rod **14** and the block **16** to respond unitarily to longitudinal forces so that each of the aforementioned parts may efficiently accomplish their respective functions while acting as a unit.

As best seen in Figure 2, it will be perceived that the draft gear **9**, excepting the coupler **10**, is wholly mounted within a main housing or frame means **23**. It will also be seen in Figure 2 that the coupler **10** and the integral draw bar **11** are loosely supported at **24** by a transverse cross support **25**, which is suitably secured to the main housing **23**, and so as to permit horizontal pivoting of the draw bar.

Fixedly secured to the housing **23** in longitudinal spaced relation to the pivot means **13** and guide block **16** is a fluid receiving cylinder **26** adapted to provide dampening means so as to cushion longitudinal impact forces applied through the coupler. The cylinder **26** is apertured at **27** (Figure 1) to permit the piston rod **14** to extend therethrough when the rod **14** is bolted at **28** to a longitudinally movable piston **29**. A suitable fluid seal **27***a* may be disposed around rod **14** in aperture **27**. Also, the cylinder **26** may, if it is so desired, be mounted on rubber at **26***a* in a floating arrangement so as to always have piston rod **14** in alignment with draw bar **11** and thus minimize wear on the piston parts and seal.

The piston **29** is adapted to conform generally to the cylindrical bore of the cylinder **26** and to slide longitudinally within the confines of the cylinder. In Figure 1, the piston is shown to be apertured so as to provide a longitudinal passageway **30** through which dampening fluid may pass. Positioned adjacent and extending vertically into the passageway **30** is a meterng device **31** of the conventional ball and screw type which is manually adjustable and capable of regulating the rate of fluid flow through the piston **29**. By adjusting the device the dampening action of the piston may be pre-set as desired. This metering valve may be an automatic type as shown in Figure 4 hereinafter described.

Mounted and extending longitudinally between the piston **29** and a vertical end cylinder wall **32** is a compression spring or spring means **33**. The spring **33** has a propensity to urge the piston **29** toward the other vertical cylinder wall **34** so as to hold the piston in normal extended position. Hence, after a longitudinal impact force has been applied to the coupler and transmitted to the piston which in turn dampers the impact, the spring gradually will urge the piston to return to its normal position (as shown by dotted lines in Figure 1) so as to be in proper position to dampen subsequent impact.

Referring now to Figure 1, it is seen that the housing **23** has a pair of integral angular stop flanges **35—35** mounted thereon in opposed relation adjacent the longitudinal opening **36** of the housing and through which the draw bar **11** projects. It is also seen that there is a pair of vertical angular stop flanges **37—37** likewise mounted on the housing **23** in opposed relation but between the block **16** and the cylinder wall **34**.

Mounted on each of the flanges **35—35** and **37—37**, is a resilient cushioning buffer element **38**, made out of a suitable rubber, plastic or the like cushioning material. Similar cushioning material could be incorporated in the end surfaces **16***a* of the block **16** if so desired.

The aforementioned flanges and buffer element serve to restrict the longitudinal movement of the block **16** and to further dampen impact forces applied against the coupler. It has been found, that where the impact is extraordinary in character, in order to preclude the draw bar **11** and the piston **29** from being driven through the cylinder wall **32** or pulled through the cylinder wall **34**, additional so-called emergency stop means as above described should be provided.

Thus, the cylinder **26** and piston **29** provide ample dampening for the ordinary longitudinal impact forces.

However, since there is an ever present possibility that the impact will be too great to be fully handled by the cylinder dampening means, the aforesaid emergency cushioning elements have been employed as a safety measure so as to preclude heavy damage to the gear **9**.

From the foregoing, it is clear that I have provided a novel slidable guide block encompassing the pivotal connection between the draw bar or rod and the dampening piston. While such guide means is embraced in a single block, it is, of course, within the spirit of this invention to make the guide in a multiple of sections. Also, while the pivot in the illustrated embodiment is shown in the block, from the standpoint of the sliding coacting between the housing and the dampening draw bar or rod, the desired guiding could be effected between the end resilient stops or buffers **38** even though the pivot was not within the confines of the guide block.

In Figure 4, a modified form of automatic metering valve **39** is shown mounted within and supported by piston **29'**, corresponding to piston **29** of Figure 1. The piston **29'** has a transverse bore **40** drilled through the piston and is provided with a valve seat **41** positioned adjacent and communicates with the passageway **30'** and within the piston bore **40**.

The valve **39** has as its component parts a metering pin **42** which is adapted to rest on the valve seat **41** when in normal position; compression spring means **43** which is normally adapted to hold the pin **42** in a seated position; and a plug seal **44** insertable within the bore **40** and press fitted therein.

By virtue of the use of a valve of this type, when heavy impact forces are applied through the piston rod **14'**, the pin **42** may be progressively urged radially outwardly into the bore **40** against the radially inward force of the spring means **43**.

The valve will assist in giving the desired cushioning effect by reason that it is particularly adapted to cope with wide variations of impact force transmitted through the piston rod to the piston. This valve will self-adjust in accordance with the force of impact and the corresponding fluid pressure exerted through the passageway **30'**.

In addition, while from the standpoint of simplicity only one coupler is shown, it will be appreciated that another coupler dampening assembly could extend from the opposite end of the housing to the other end of the car, in which event the housing could be disposed midway of the length of the car.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. In a railroad car draft gear, hitching means having a draw bar, frame means attachable to a car, said bar extending longitudinally of said frame means and supported thereon and longitudinally movable with respect thereto in response to pressure on said hitching means, pivot means for said bar, a guide on and slidable with said bar, resilient buffer elements supported by said frame means on opposite sides of said guide at the respective ends of its longitudinal path of travel, and fluid dampening means connected to said bar for dampening its travel between said elements to minimize the transmission of shock to the car upon sudden forces being applied to said hitching means.

2. In a railroad car draft gear, hitching means having a draw bar including a rod, frame means attachable to a car, said rod extending longitudinally of said frame means and supported thereon for movement along a longitudinal path with respect thereto in response to pressure on said hitching means, pivot means for said rod, a guide on and movable with said rod and in slidable cooperation with said frame means, resilient buffer elements supported by said frame means at spaced points along said longitudinal path of travel and fluid dampening means connected to said rod for dampening its travel along said path to

minimize the transmission of shock to the car upon sudden forces being applied to said hitching means.

3. In a railroad car draft gear, a coupler having a pivotal draw bar, a housing, attachable to the underside of a car, into an open end of which said bar extends for pivotal support therein and which bar is longitudinally movable in the housing in response to pressure on the coupler, a cylinder of fluid extending longitudinally in and away from the open end of said housing, a piston in and movable lengthwise of said cylinder and having a metering orifice through which dampening fluid can flow from one side of the piston to the other in said cylinder, a piston rod secured at one end to said piston in said cylinder and having its other and outer end projecting to the exterior of the cylinder in and toward the open end of said housing, a pivotal connection between said outer rod end and the end of the draw bar in said housing, said connection including a block slidably disposed in said housing, a resilient buffer fixed in said housing between said pivotal connection and an adjoining end of said cylinder, and a second resilient buffer secured in housing between its open end and said pivotal connection, said block being slidable into engagement with said second buffer against the dampening action of said fluid upon a pulling force being exerted on said coupler and being slidable into engagement with said first buffer against the dampening action of said fluid upon an impact force being applied to said coupler.

4. In a railroad car draft gear, a coupler having a pivotal draw bar, a housing, attachable to the underside of a car, into an open end of which said bar extends for pivotal support therein and which bar is longitudinally movable in the housing in response to pressure on the coupler, means pivotally supporting the end of said bar in said housing and including a block slidably engaged with the walls of said housing, spaced resilient buffer elements in said housing on opposite sides of said block at the ends of its travel and fluid dampening means connected directly to said block for dampening its travel between said elements to minimize the transmission of shock to the car upon sudden forces being applied to the draw bar.

5. In a railroad car draft gear, a coupler having a pivotal draw bar, a housing, attachable to the underside of a car, into an open end of which said bar extends for pivotal support therein and which bar is longitudinally movable in the housing in response to pressure on the coupler, a cylinder of fluid extending longitudinally in and away from the open end of said housing, a piston in and movable lengthwise of said cylinder and having a metering orifice through which dampening fluid can flow from one side of the piston to the other in said cylinder, a piston rod secured at one end to said piston in said cylinder and having its other and outer end projecting to the exterior of the cylinder in and toward the open end of said housing, a pivotal connection between said outer rod end and the end of the draw bar in said housing, said connection including a block slidably disposed in said housing, a resilient buffer fixed in said housing between said pivotal connection and an adjoining end of said cylinder, a second resilient buffer secured in housing between its open end and said pivotal connection, said block being slidable into engagement with said second buffer against the dampening action of said fluid upon a pulling force being exerted on said coupler and being slidable into engagement with said first buffer against the dampening action of said fluid upon an impact force being applied to said coupler, and a spring exerting a force on said piston at all times tending to move said block into engagement with said second buffer.

6. In a railroad car draft gear, hitching means having a draw bar, frame means attachable to a car, said bar extending longitudinally of said frame means and supported thereon and longitudinally movable with respect thereto in response to pressure on said hitching means, pivot means for said bar, a guide on and slidable with said bar, resilient buffer elements on opposite sides of said guide and effective at the respective ends of its longitudinal path of travel, and fluid dampening means connected to said bar for dampening its travel to minimize the transmission of shock to the car upon sudden forces being applied to said hitching means.

7. In a railroad car draft gear, hitching means having a draw bar, frame means attachable to a car, said bar extending longitudinally of said frame means and supported thereon and longitudinally movable with respect thereto in response to pressure on said hitching means, pivot means for said bar, a guide on and slidable with said bar, resilient buffer elements on opposite sides of said guide and effective at the respective ends of its longitudinal path of travel, fluid dampening means connected to said bar for dampening its travel to minimize the transmission of shock to the car upon sudden forces being applied to said hitching means and automatically adjustable metering means responsive to variations in impact pressures for varying rate of flow of dampening fluid.

8. In a railroad car draft gear, hitching means having a draw bar, frame means attachable to a car, said bar extending longitudinally of said frame means and supported thereon and longitudinally movable with respect thereto in response to pressure on said hitching means, pivot means for said bar, a guide on and slidable with said bar, resilient buffer elements on opposite sides of said guide and effective at the respective ends of its longitudinal path of travel, fluid dampening means connected to said bar for dampening its travel to minimize the transmission of shock to the car upon sudden forces being applied to said hitching means, said fluid dampening means including a piston and a cylinder with dampening fluid therein, and a floating support for said cylinder.

9. In a railroad car draft gear, hitching means having a draw bar, frame means attachable to a bar, said bar extending longitudinally of said frame means and supported thereon and longitudinally movable with respect thereto in response to pressure on said hitching means, pivot means for said bar, a guide on and slidable with said bar, said frame means including stops on opposite sides of said guide confining the longitudinal movement of said guide, resilient buffer elements on opposite sides of said guide between said guide and said stops cushioning said guide as the guide is moved back and forth between the stops, and fluid dampening means connected to said bar for dampening its travel between said elements to minimize the transmission of shock to the car upon sudden forces being appplied to said hitching means on opposite sides of said guide between said frame means and said guide.

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