Jan. 9, 1940. H. D. PAGE 2,186,267

CUSHIONING MECHANISM

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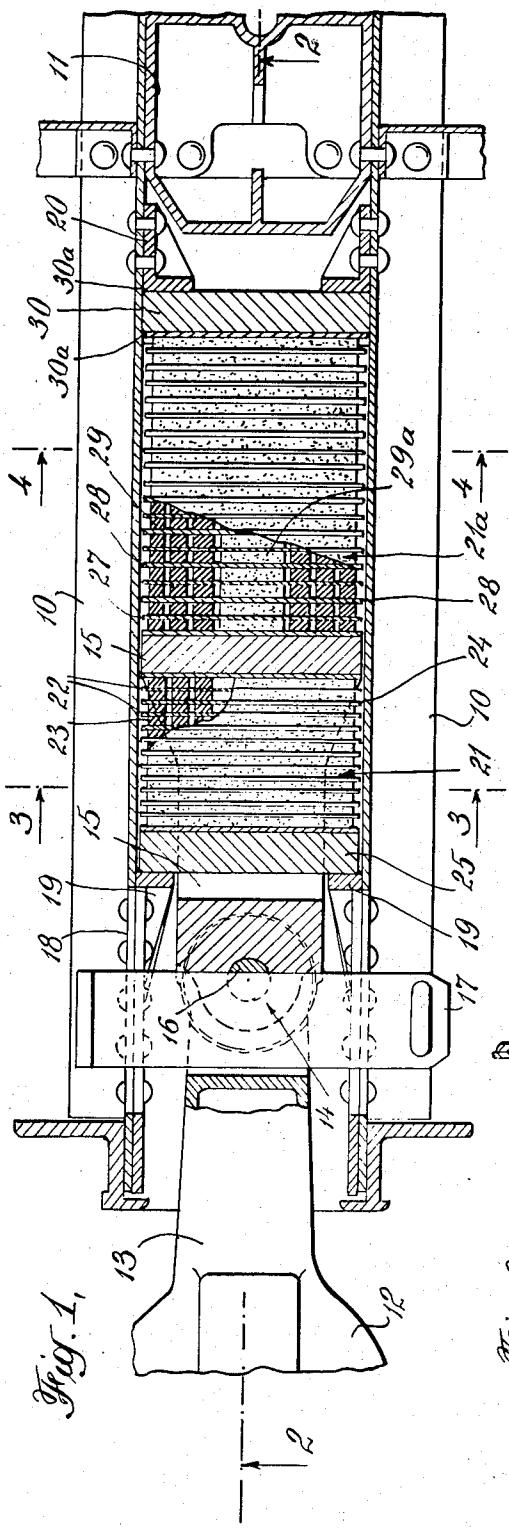


Fig. 1.

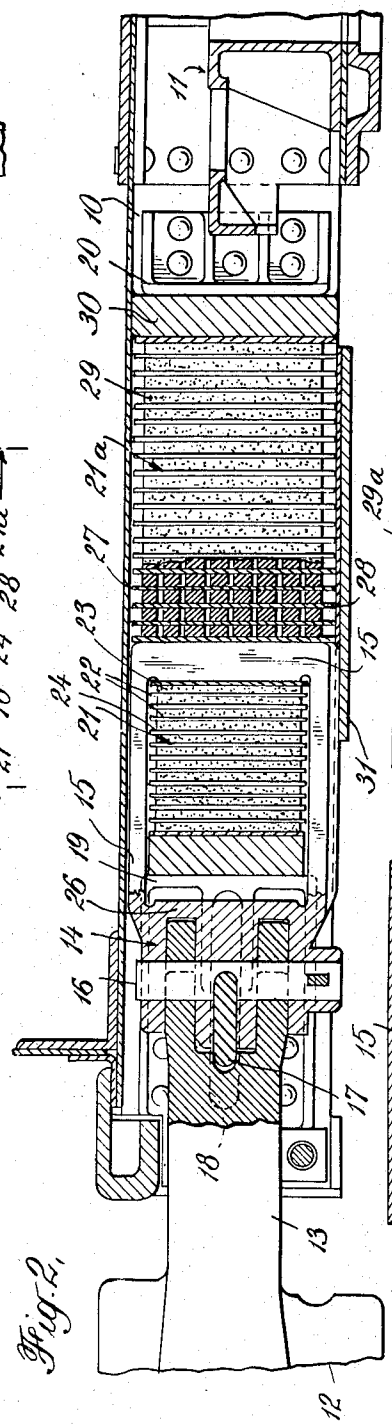


Fig. 2.

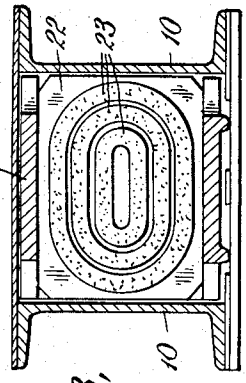


Fig. 3.

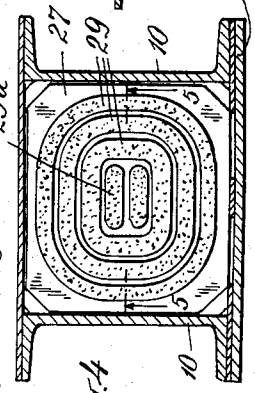


Fig. 4.

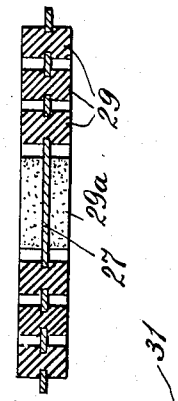


Fig. 5.

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CUSHIONING MECHANISM

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4 Claims. (Cl. 213—46)

This invention relates to coupling and draft mechanism for use on railway vehicles, such as cars or motive power units, and is concerned more particularly with a novel apparatus for connecting together the units of a train, which offers numerous advantages over those previously used for the same purpose. The new apparatus may be employed, with suitable changes necessary to meet the different conditions of operation, on vehicles for either freight or passenger service, but for purposes of explanation, an application of the principles of the invention to freight cars will be described in detail. It is to be understood, however, and will be readily apparent, that the utility of the invention is not limited to its use on railway vehicles of particular sizes and characteristics employed for specific purposes.

In my copending application Serial No. 72,702 filed April 4, 1936, there is disclosed a cushioning and draft mechanism for railway vehicles, by which movements of the coupler and connecting element, such as a yoke, produced by forces in buff and draft applied to the coupler are resisted and cushioned by a pair of cushioning units operating in alternation. These units, which in practice are ordinarily made up of a plurality of rubber-bearing and spacer plates of sheet metal, are arranged in line within the draft pocket of the vehicle, and engage abutment means at one end and the yoke at the other. As the coupler and yoke are moved by forces in buff or draft, one unit is compressed between the yoke and abutment means and the other unit is free to expand. In the constructions disclosed in the application referred to, the rubber-bearing plates of the two units are alike, carrying the same amount of rubber disposed on the plates in the same manner and having the same surface area and thickness. The units, accordingly, have the same capacity and travel.

In railway operation, the car couplers, particularly those of freight cars, are ordinarily subjected to greater forces in buff than in draft, and it is, therefore, desirable that the cushioning mechanism should have a greater capacity for cushioning buff forces than draft forces. Also, to insure smooth operation, the cushioning mechanism should have a greater travel in buff than in draft so that the greater buff forces may be cushioned gently. To accomplish these purposes, it has been suggested heretofore that the cushioning apparatus include a main mechanism operating both in buff and draft, and a supplemental unit coming into action only under buff conditions. In such a construction, the supplemental unit is ordinarily placed to the rear of the car body bolster and this is objectionable, since such an apparatus is expensive and it can not be applied to a completed car without substantial alterations in the car structure.

The present invention is, accordingly, directed to the provision of a cushioning and draft mechanism of the type disclosed in my copending application which operates with a differential cushioning action, providing greater capacity in buff than in draft and accomplishing this purpose without the use of a supplemental cushioning unit, as above mentioned. The mechanism includes a pair of cushioning units disposed in the usual draft pocket of the vehicle between the longitudinal sills thereof, with one of the units enclosed within the yoke attached to the coupler and the other outside the yoke. The units may be of various types, as suggested in the prior application, but are preferably composed of alternately arranged rubber-bearing and spacer plates, and the plates of the outside unit are of greater area than those in the inside unit and carry a larger amount of rubber. Preferably, each rubber-bearing plate in the outside unit has a greater effective area of rubber than that on the plates within the yoke, and the outside unit may contain the same number of rubber-bearing plates as the inside unit, in which case, the mechanism has the same travel in buff and in draft, or, if desired, the outside unit may contain more plates than the inside unit. Since the arrangement of the yoke and units is such that the inside unit is effective in draft and the outside is effective in buff, the use of a greater number of plates in the outside unit gives the mechanism a greater travel in buff than in draft, and in all cases, the mechanism has a greater capacity in buff than in draft.

For a better understanding of the invention, reference may be had to the accompanying drawing, in which

Figure 1 is a horizontal, sectional view through a coupler and draft mechanism of the invention, with parts shown in plan;

Figures 2, 3, and 4 are views on the lines 2—2, 3—3, and 4—4, respectively, of Figure 1; and

Figure 5 is an enlarged sectional view through a rubber-bearing plate on the line 5—5 of Figure 4.

In the drawing, the mechanism of the invention is illustrated as installed on a railway vehicle, such as a car or a motive power unit, which is provided with a pair of longitudinal sills 10 between which is a center filler casting 11 disposed

inward from the end of the car and lying in line with the car body bolster. The car is provided with the usual coupler 12 having a shank 13 which extends into the space between the sills and is attached as by a swivel connection, generally designated 14, to a vertical yoke 15. The swivel connection includes a pin 16 passing through aligned lugs on the shank and yoke, and a key 17 passes through the shank with its ends extending through slots in cheek plates 18 attached to the sills.

Between the sills is a draft pocket defined by pairs of front and rear draft stops 19, 20, secured to the sills, as by riveting or the like, and in the draft pocket is a cushioning mechanism which consists of a front cushioning unit and a rear cushioning unit, generally designated 21, 21*a*, respectively. In standard equipment, such a draft pocket is of definite prescribed dimensions. The front unit 21 comprises a plurality of sheet metal plates 22, which, in the construction shown, have three concentric endless bands 23 of rubber on each face, the bands being held in place by tongues of rubber which pass through openings through the plates. Arranged alternately with the plates 22 are sheet metal spacer plates 24, and at the forward end of the unit is a follower block 25 which makes contact with the front draft stops 19. The yoke 15 encircles the front unit only, and its front end member 26 lies spaced from the follower block in the ordinary condition of the device.

The rear unit 21*a*, which lies outside the yoke, comprises a plurality of rubber-bearing plates 27 and alternately arranged spacer plates 28. Since the yoke encircles the front unit only, the space in the pocket available for the rear unit is greater than that for the front unit, and the plates of the rear unit may be of a greater height than those employed in the front unit and may thus carry rubber so arranged as to have a greater effective area. In the construction shown, each plate 27 includes not only three concentric endless bands of rubber 29, but also a pair of rubber bars 29*a* centrally disposed. By reason of the greater height of the plates in the rear unit and the additional bars of rubber used, the amount of rubber on the rear unit plates may be much greater than that on the plates in the front pocket for the same overall thickness, and the effective area of the rubber on the rear unit plates may be similarly increased. In addition, more plates may be used in the rear unit, as, for example, in the construction shown, the rear unit contains nine rubber-bearing plates and the front unit six. The rear unit also includes the usual follower block 30 contacting with the rear draft stops 20 and this block may be welded to the sills as at 30*a*, if desired. If a less number of plates is desired in the rear unit, the space which they would occupy may be filled by a suitable filler block lying in front of and in contact with the follower block.

The cushioning mechanism and yoke are supported in the pocket by any suitable means, such as a carrier plate 31 secured to the lower flanges of the sills.

In the installation of the new mechanism in a car, the cushioning units are placed in the draft pocket under an initial compression and when the coupler is subjected to a force in draft, the movement of the yoke compresses the front unit against the front draft stops, the coupler and yoke movement being resisted and cushioned in this compressing action. Upon the application of a force in buff, the rear unit is compressed and resists and cushions the movement of the coupler and yoke. Since the rear unit contains plates having larger surface areas of rubber than those of the plates in the front unit, the rear unit has a greater cushioning capacity. Also, when a larger number of rubber-bearing plates is employed in the rear unit, the column of rubber formed by the aligned masses on the several plates is longer than the similar column in the front unit, and the rear unit thus has a longer travel. The new mechanism, therefore, operates differentially and provides the greater capacity necessary to resist the larger forces in buff and may provide the longer travel under buff conditions, which insures that the greater buff forces will be cushioned smoothly and easily.

If desired, the cushioning units may be installed under an initial high effective compression, in accordance with the principles set forth in my copending application above referred to. When thus installed, each unit has an expansibility equal to the amplitude of movement of the coupler and yoke occurring under normal operating conditions so that the units are in continuous contact with the draft stops and yoke under such conditions. A continuous cushioning is thus normally obtained and the transmission of shocks and jars from the coupler to the car structure is prevented.

Since the new mechanism does not involve the use of a supplemental unit and can be installed in a standard draft pocket, it may be employed in equipment in use as well as in new cars at no substantial cost for alterations in car structure. Also, the small increase in cost over the mechanism of the prior application arising from the use of larger plates in the rear unit is offset by a saving from the use of a smaller yoke.

I claim:

1. The combination in a railway vehicle, such as a car or motive power unit, of a draft pocket on the vehicle structure, transverse abutment means having parts disposed at opposite ends of the pocket, a pair of cushioning units lying end to end within the pocket and contacting at their remote ends with said parts of the abutment means, a coupler, and a yoke connected to the coupler and encircling one of the units and having a part lying between and in contact with the adjacent ends of the units, the other end of the encircled unit being out of contact with the yoke and the units being longitudinally confined only by said parts of the abutment means and said part of the yoke, the units being compressed in alteration to cushion buff and draft movements of the coupler and yoke with the unit undergoing compression constituting the sole restriction on the movement of the coupler and yoke in which such compression occurs, each unit being made up of alternate rubber-bearing and spacer plates and the rubber-bearing plates of each unit carrying like masses of rubber having like total surface areas, the plates of the unit outside the yoke having greater masses of rubber with a greater total surface area than the plates inside the unit, and the units being installed between said part of the yoke and said parts of the abutment means under compression, such that, as one unit is compressed, the other expands.

2. The combination in a railway vehicle, such as a car or motive power unit, of a draft pocket on the vehicle structure, transverse abutment means having parts disposed at opposite ends of

the pocket, a pair of cushioning units lying end to end within the pocket and contacting at their remote ends with said parts of the abutment means, a coupler, and a yoke connected to the coupler and encircling one of the units and having a part lying between and in contact with the adjacent ends of the units, the other end of the encircled unit being out of contact with the yoke and the units being longitudinally confined only by said parts of the abutment means and said part of the yoke, the units being compressed in alternation to cushion buff and draft movements of the coupler and yoke with the unit undergoing compression constituting the sole restriction on the movement of the coupler and yoke in which such compression occurs, each unit being made up of alternate rubber-bearing and spacer plates and the rubber-bearing plates of each unit carrying like masses of rubber having like total surface areas, the plates of the unit outside the yoke having greater masses of rubber with a greater total surface area than the plates of the unit inside the yoke and the unit outside the yoke having a greater number of rubber-bearing plates than the unit inside the yoke, and the units being installed between said part of the yoke and said parts of the abutment means under compression, such that, as one unit is compressed, the other expands.

3. The combination in a railway vehicle, such as a car or motive power unit, of a draft pocket on the vehicle structure, transverse abutment means having parts disposed at opposite ends of the pocket, a pair of cushioning units lying end to end within the pocket and contacting at their remote ends with said parts of the abutment means, a coupler, and a yoke connected to the coupler and encircling one of the units and having a part lying between and in contact with the adjacent ends of the units, the other end of the encircled unit being out of contact with the yoke and the units being longitudinally confined only by said parts of the abutment means and said part of the yoke, the units being compressed in alternation to cushion buff and draft movements of the coupler and yoke with the unit undergoing compression constituting the sole restriction on the movement of the cupler and yoke in which such compression occurs, each unit being made up of alternate rubber-bearing and spacer plates and the rubber-bearing plates of each unit carrying like masses of rubber having like total surface areas, the plates of the unit outside the yoke having gerater masses of rubber with a greater total surface area than the plates inside the unit, the units being installed between said part of the yoke and said parts of the abutment means under such compression that each unit has an expansivity approximately as great as the greatest amplitude of movement of the coupler and yoke against the resistance of the other unit under normal operating conditions.

4. The combination in a railway vehicle, such as a car or motive power unit, of a draft pocket on the vehicle structure, transverse abutment means having parts disposed at opposite ends of the pocket, a pair of cushioning units lying end to end within the pocket and contacting at their remote ends with said parts of the abutment means, a coupler, and a yoke connected to the coupler and encircling one of the units and having a part lying between and in contact with the adjacent ends of the units, the other end of the encircled unit being out of contact with the yoke and the units being longitudinally confined only by said parts of the abutment means and said part of the yoke, the units being compressed in alternation to cushion buff and draft movements of the coupler and yoke with the unit undergoing compression constituting the sole restriction on the movement of the coupler and yoke in which such compression occurs, each unit being made up of alternate rubber-bearing and spacer plates and the rubber-bearing plates of each unit carrying like masses of rubber having like total surface areas, the plates of the unit outside the yoke having greater masses of rubber with a greater total surface area than the plates of the unit inside the yoke and the unit outside the yoke having a greater number of rubber-bearing plates than the unit inside the yoke, the units being installed between said part of the yoke and said parts of the abutment means under such compression that each unit has an expansivity approximately as great as the greatest amplitude of movement of the coupler and yoke against the resistance of the other unit under normal operating conditions.

HAROLD D. PAGE.