April 22, 1947. G. E. DATH 2,419,254

BUFFER

Filed Sept. 15, 1944

Fig. 1

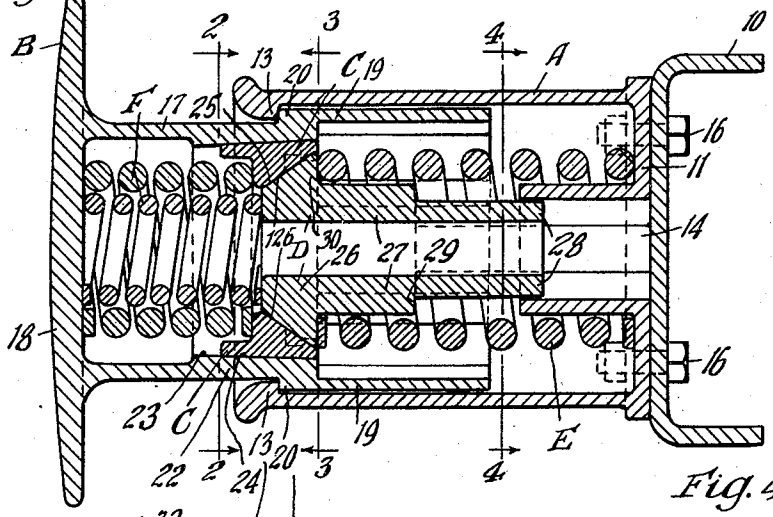


Fig. 2

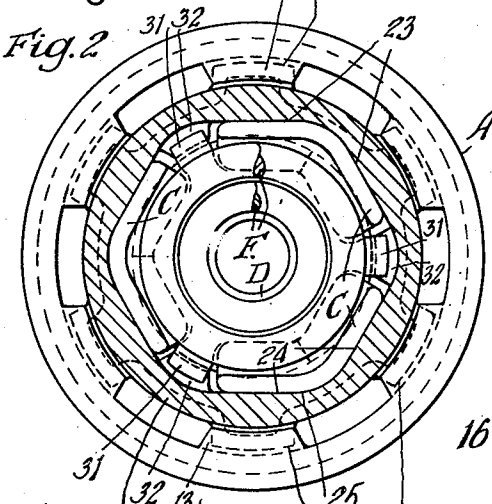


Fig. 4

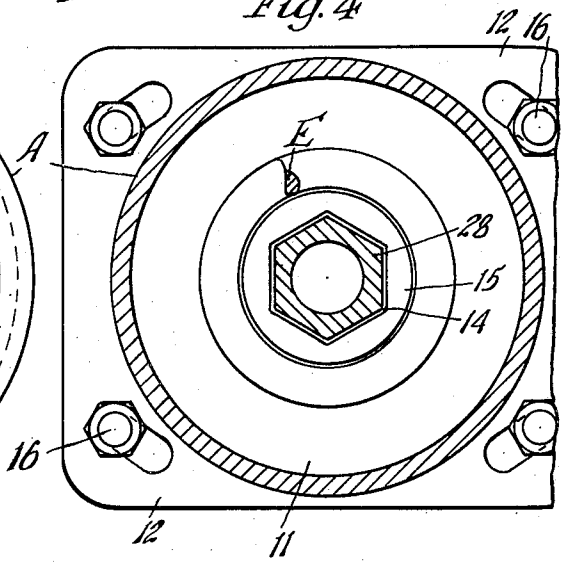
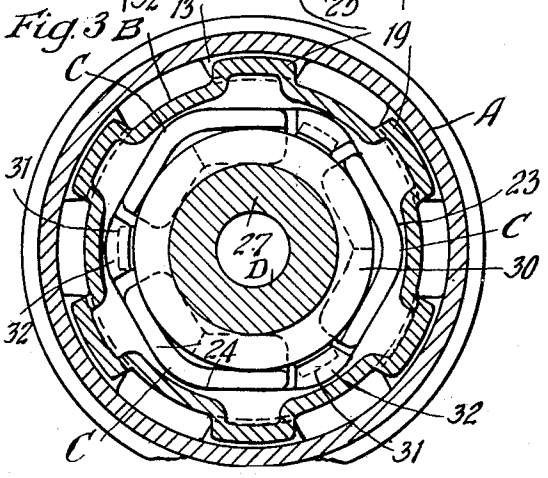


Fig. 3



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BUFFER

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9 Claims. (Cl. 213—221)

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This invention relates to improvements in buffers for railway cars.

One object of the invention is to provide a buffer mechanism for railway cars having initial spring action to absorb the lighter shocks to which the mechanism is subjected, followed by higher frictional resistance to take care of the heavier shocks.

A more specific object of the invention is to provide a buffer mechanism comprising a housing fixed to the car; a buffer head including a friction casing slidingly telescoped within the housing; friction shoes having sliding frictional engagement with the interior walls of the casing; a wedge block in wedging engagement with the shoes; spring means yieldingly opposing inward movement of the wedge block with respect to the housing; and a second spring means yieldingly opposing movement of the shoes and wedge with respect to the casing in lengthwise direction toward each other, wherein the buffer head and the housing have cooperating stop lugs in shouldered engagement with each other for limiting relative lengthwise separation of the buffer head and housing, and the wedge, shoes, and buffer head are locked against rotation with respect to the housing to maintain the longitudinal alignment of the lugs and thus prevent accidental disengagement of said lugs from each other.

Other objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawing forming a part of this specification, Figure 1 is a longitudinal, vertical sectional view of my improved buffer mechanism, illustrating the same mounted in position on the end of a railway car. Figures 2, 3, and 4 are transverse, vertical sectional views, corresponding respectively to the lines 2—2, 3—3, and 4—4 of Figure 1.

In said drawing, 10 indicates a portion of the end wall of a railway car, the portion illustrated being at one side of the longitudinal center line of the car and having my improved buffer mechanism mounted thereon. As will be understood, the buffer mechanism is duplicated at the other side of the end of the car and the two mechanisms cooperate in a well-known manner with a pair of similar buffer mechanisms on the end of an adjacent car.

My improved buffer mechanism comprises broadly a housing A; a buffer head B; three friction shoes C—C—C; a wedge block D; a spring resistance E; and an additional spring resistance F.

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The housing A is in the form of a tubular shell closed at the rear end by a transverse wall 11, which is extended laterally outwardly at opposite sides of the shell to provide securing flanges 12—12. The housing A, as shown, is of cylindrical cross section and is provided with six equally spaced, inturned stop lugs 13—13 at the front end thereof, which is open. The rear wall 11 of the housing A is provided with a central opening 14 therethrough and interiorly of the housing a tubular guide sleeve 15 is provided which is aligned with the opening 14 and extends inwardly from the wall 11, being formed integral therewith. The tubular guide sleeve 15 is of hexagonal, transverse cross section, thereby providing an interior guide opening or bore, which is of hexagonal shape. The housing A is secured to the wall 10 of the car by any suitable means, such as bolts 16—16, extending through slots in the flanges 12—12 and suitable openings in the wall 10 of the car.

The buffer head B comprises a cylindrical casing 17 which is closed at the front end by a transverse wall 18 which extends laterally outwardly of the head on all sides thereof, thereby providing the buffer head proper. The casing 17 is telescoped within the housing A and has lengthwise sliding movement therein. At the rear end, that is, the open end of the casing 17, the same is provided with longitudinally extending, radially outwardly offset sections 19—19 providing shoulders 20—20 forming retaining lugs. The offset sections 19 and lugs 20 are six in number and the latter cooperate with the six inturned stop lugs 13—13 of the housing A. The lugs 20 are of such a width that they will pass freely between adjacent of the inturned stop lugs 13—13 to facilitate assembling of the housing A and buffer head B, the shoulders of the buffer head being brought into alignment with the shoulders of the housing by giving the buffer head a slight turn. The offset sections or portions 19—19 of the casing 17 fit the interior of the cylindrical wall of the housing A and form guide members which prevent tilting or drooping of the buffer head. The offset sections 19—19 are of the same width as the lugs 20. The casing wall is interiorly thickened, as indicated at 22, forwardly of the offset sections 19—19. The thickened portion 22 of the casing is of hexagonal, interior cross section and presents three forwardly converging friction surfaces 23—23—23 of V-shaped, transverse cross section, the adjacent hexagonal side walls of the casing forming the V-shaped friction surfaces.

The friction shoes C are three in number and

have outer, longitudinally extending friction surfaces 24—24—24, each surface being of V-shaped, transverse cross section and engaging respectively with the corresponding V-shaped friction surface 23 of the casing 17. On the inner side, each shoe presents a flat wedge face 25, the wedge faces 25—25—25 of the three shoes converging inwardly or forwardly of the mechanism.

The wedge D is in the form of an elongated, hollow, postlike member having a head 26 at the front end thereof provided with wedge faces 126, and a shank 27 extending rearwardly from the head. The inner end portion of the shank or stem 27 of the wedge D is of hexagonal, transverse cross section and slidingly fits within the guide sleeve 15 of the housing A. Forwardly of the hexagonal section 28, the shank or stem of the wedge is of cylindrical, transverse cross section, thereby providing a stop shoulder 29, which is adapted to engage the front or outer end of the sleeve 15 to limit movement of the wedge rearwardly of the mechanism. The parts are so proportioned that movement of the wedge D is limited before the mechanism has been completely or fully compressed, thereby compelling the wedge to move with respect to the friction casing 17 during the last part of the compression stroke. The enlarged head 26 of the wedge D provides a rearwardly facing, annular abutment shoulder 30 where it joins the shank 27. The shoulder 30 serves as an abutment for the front end of the spring resistance E. To hold the wedge D assembled with the casing 17, lugs 31 are provided which project laterally outwardly or radially from the wedge and engage corresponding lugs 32—32—32 at the inner end of the casing 17. The lugs 31 of the wedge extend between adjacent shoes, thereby locking the wedge and shoes against relative rotation with respect to each other about the longitudinal central axis of the casing.

The spring E is in the form of a single, relatively heavy, helical coil and surrounds the shank or stem 27 of the wedge D and the guide sleeve 15 of the housing A and bears at its front end on the abutment shoulder 30 of the wedge and at its rear end on the transverse end wall 11 of the housing A.

The spring resistance F comprises inner and outer, helical coils, which bear at their front ends on the transverse wall 18 of the buffer head B. The inner spring bears at its rear end on the wedge D and the outer spring bears at its rear end on the shoes C—C—C which are provided with transverse abutment shoulders for this purpose.

In assembling the mechanism, the spring resistance F and the shoes C—C—C are first placed within the casing 17 of the buffer head B and the shoes forced inwardly to an extent to clear the inner sides of the lugs 32—32—32 of the casing 17, the shoes being forced inwardly to such an extent that the lugs 31 of the wedge will pass freely between the outer ends of the shoes and the inner sides of the lugs 32. The wedge is then inserted within the casing 17 and moved inwardly to an extent to bring the lugs 31—31—31 thereof inwardly of the lugs 32—32—32 of the casing. As will be understood, the lugs of the wedge are positioned to pass between the lugs of the casing during this operation. The wedge is then given a partial turn to bring the lugs thereof into alignment with the lugs of the casing and the pressure is removed from the shoes to permit the spring F to expand and force the shoes outwardly into engagement with the wedge D with the lugs 31 of the wedge disposed between adjacent shoes. As will be evident, outward movement of the wedge is limited by engagement of the lugs thereof with the lugs 32 of the casing. The spring E is then placed over the shank of the wedge D and the housing is telescoped over the inner end of the casing 17. In applying the housing A to the casing 17, a tool in the form of a bar is employed, which is entered through the sleeve 15 and engaged with the rear end of the shank of the wedge D to force the wedge inwardly of the casing 17 to such an extent that the rear end of the shank will clear the front end of the sleeve 15 of the housing while the lugs 13 of the housing are being engaged with the shoulders or lugs 20 of the casing of the buffer head B. While the housing A is being applied to the casing 17 of the buffer head, the former is turned to a position that the lugs 13 thereof will pass between the lugs 20 of the casing. After the lugs 13 have been brought to a position forwardly of the lugs 20, the housing A is given a partial turn with respect to the casing 17 to bring the lugs of the former in longitudinal alignment with the lugs of the latter. During this operation, the hexagonal portion 28 of the shank of the wedge D is brought into registration with the hexagonal opening of the sleeve 15 of the housing A. The holding tool is then removed, permitting the spring resistance F to force the wedge and shoes rearwardly, projecting the hexagonal shank of the wedge into the sleeve 15, thereby locking the wedge against rotation with respect to the housing A. In this connection it is pointed out that the locking of the shank of the wedge to the sleeve 15 of the housing also effects positive locking of the buffer head B against rotation with respect to the housing A so that the lugs 20 of the casing are maintained in longitudinal alignment with the lugs 13 of the housing. This interlocking of the parts is effected by the V-shaped, interengaging arrangement of the friction surfaces of the shoes C—C—C and the casing 17, and the lugs 31—31—31 of the wedge which are engaged between adjacent of the shoes C—C—C. It should be further noted that the flat engagement of the wedge faces of the wedge D and shoes C—C—C also serves to lock the shoes against rotation with respect to the wedge.

The operation of my improved buffer mechanism is as follows: Upon inward movement of the buffer head B, through pressure exerted thereon by any object, such as a buffer head of an adjacent car, the head B is forced inwardly of the housing A, carrying the shoes C—C—C and the wedge D therewith, and compressing the spring resistance E, which functions as a preliminary spring to absorb the lighter shocks. Upon further compression of the mechanism, the movement of the wedge is arrested by engagement with the sleeve 15, thereby compelling the casing 17 to slide inwardly with respect to the friction shoes during the remainder of the compression stroke. Due to the wedging engagement between the shoes C—C—C and the wedge D, high frictional resistance is provided during this last mentioned stage of the operation to absorb the heavier shocks. When the actuating force or pressure is removed from the buffer head B, the spring resistance E returns the buffer head and the wedge D to the normal full release position shown in Figure 1 and the spring F brings the wedge into shouldered engagement with the stop lugs of the casing 17 and the shoes to their full release position, as shown in said figure. As will be evident, outward movement of the buffing head

is positively limited by shouldered engagement of the lugs 20 of the head with the lugs 13 of the housing A.

I have herein shown and described what I now consider the preferred manner of carrying out my invention, but the same is merely illustrative and I contemplate all changes and modifications that come within the scope of the claims appended hereto.

I claim:

1. In a buffer for railway cars, the combination with a housing adapted to be secured to a car; of a buffer head including a friction casing projecting therefrom and telescoped within the housing, said housing and casing having interengaging lugs limiting lengthwise separation of the housing and casing; friction shoes slidingly telescoped within the casing, said shoes and casing having interengaging friction surfaces restricting the shoes to movement in a direction lengthwise of the casing; a wedge having wedging engagement with the shoes on flat, interengaging faces; guide means on the housing limiting the wedge to lengthwise movement with respect to said housing; spring means yieldingly opposing lengthwise movement of the wedge inwardly of the housing; and spring means within the casing yieldingly opposing movement of the wedge and shoes toward the buffer head.

2. In a buffer for railway cars, the combination with a housing adapted to be secured to the end of a car; of a buffer head including a friction casing section, said friction casing section being slidingly telescoped within the housing; interengaging shoulders on said casing section and housing for limiting lengthwise separation of the housing and buffer head; friction shoes slidingly telescoped within the casing; a wedge engaging said shoes to spread the same apart; spring means yieldingly opposing relative movement of the wedge and housing toward each other; means limiting relative movement of the housing and wedge to less than the full compression stroke of the mechanism; and spring means yieldingly opposing movement of the wedge and shoes inwardly of the casing section.

3. In a buffer for railway cars, the combination with a housing adapted to be secured to a car; of a buffer head including a friction casing projecting therefrom and telescoped within the housing, said housing and casing having interengaging lugs limiting lengthwise separation of the housing and casing; friction shoes slidingly telescoped within the casing, said shoes and casing having interengaging friction surfaces restricting the shoes to movement in a direction lengthwise of the casing; a wedge having wedging engagement with the shoes on flat, interengaging faces; guide means on the housing limiting the wedge to lengthwise movement with respect to said housing; spring means yieldingly opposing lengthwise movement of the wedge inwardly of the housing; means limiting movement of the wedge inwardly of the housing to less than the full compression stroke of the mechanism; and spring means within the casing yieldingly opposing movement of the wedge and shoes toward the buffer head.

4. In a buffer for railway cars, the combination with a housing adapted to be secured to a car; of a buffer head including a friction casing projecting therefrom and telescoped within the housing, said housing and casing having interengaging lugs limiting lengthwise separation of the housing and casing; friction shoes slidingly telescoped within the casing, said shoes and casing having interengaging friction surfaces restricting the shoes to movement in a direction lengthwise of the casing; a wedge having wedging engagement with the shoes; guide means on the housing limiting the wedge to lengthwise movement with respect to said housing; cooperating stop lugs on the wedge and casing for limiting lengthwise separation of the casing and wedge, the lugs of the wedge being engaged between adjacent shoes to lock the wedge against rotation with respect to the shoes; spring means yieldingly opposing lengthwise movement of the wedge inwardly of the housing; and spring means within the casing yieldingly opposing movement of the wedge and shoes toward the buffer head.

5. In a buffer for railway cars, the combination with a housing adapted to be secured to a car; of a buffer head including a friction casing projecting therefrom and telescoped within the housing, said housing and casing having interengaging lugs limiting lengthwise separation of the housing and casing; friction shoes slidingly telescoped within the casing, said shoes and casing having interengaging friction surfaces of V-shaped transverse section restricting the shoes to movement in a direction lengthwise of the casing; a wedge having wedging engagement with the shoes; guide means on the housing limiting the wedge to lengthwise movement with respect to said housing; spring means yieldingly opposing lengthwise movement of the wedge inwardly of the housing; and spring means within the casing yieldingly opposing movement of the wedge and shoes toward the buffer head.

6. In a buffer for railway cars, the combination with a housing adapted to be secured to a car; of a buffer head including a friction casing projecting therefrom and telescoped within the housing, said housing and casing having interengaging lugs limiting lengthwise separation of the housing and casing; friction shoes slidingly telescoped within the casing, said shoes and casing having interengaging friction surfaces of V-shaped transverse section restricting the shoes to movement in a direction lengthwise of the casing; a wedge having wedging engagement with the shoes; guide means on the housing limiting the wedge to lengthwise movement with respect to said housing; cooperating stop lugs on the wedge and casing for limiting lengthwise separation of the casing and wedge, the lugs of the wedge extending between adjacent shoes to lock the wedge against rotation with respect to the shoes; spring means yieldingly opposing lengthwise movement of the wedge inwardly of the housing; and spring means within the casing yieldingly opposing movement of the wedge and shoes toward the buffer head.

7. In a buffer for railway cars, the combination with a housing adapted to be secured to a car; of a buffer head including a friction casing projecting therefrom and telescoped within the housing, said housing and casing having interengaging lugs limiting lengthwise separation of the housing and casing; friction shoes slidingly telescoped within the casing, said shoes and casing having interengaging friction surfaces restricting the shoes to movement in a direction lengthwise of the casing; a wedge having wedging engagement with the shoes on flat, interengaging faces; a stem of angular cross section on said wedge; a guide member on the housing having an opening of angular cross section within which said stem is guided and restricted to

lengthwise movement with respect to the housing; spring means yieldingly opposing lengthwise movement of the wedge inwardly of the housing; and spring means within the casing yieldingly opposing movement of the wedge and shoes toward the buffer head.

8. In a buffer for railway cars, the combination with a housing adapted to be secured to a car; of a buffer head including a friction casing projecting therefrom and telescoped within the housing, said housing and casing having interengaging lugs limiting lengthwise separation of the housing and casing; friction shoes slidingly telescoped within the casing, said shoes and casing having interengaging friction surfaces restricting the shoes to movement in a direction lengthwise of the casing; a wedge having wedging engagement with the shoes on flat, interengaging faces; a stem of angular cross section on said wedge; a guide sleeve integral with the housing, said sleeve having a bore of angular cross section within which the stem is guided for lengthwise movement and held against rotation; spring means yieldingly opposing lengthwise movement of the wedge inwardly of the housing; a shoulder on said wedge engageable with the end of said sleeve to limit relative movement of the wedge and housing to less than the full compression stroke of the mechanism; and spring means within the casing yieldingly opposing movement of the wedge and shoes toward the buffer head.

9. In a buffer for railway cars, the combination with a housing adapted to be secured to a car; of a buffer head including a friction casing projecting therefrom and telescoped within the housing, said housing and casing having interengaging lugs limiting lengthwise separation of the housing and casing; friction shoes slidingly telescoped within the casing, said shoes and casing having interengaging friction surfaces restricting the shoes to movement in a direction lengthwise of the casing; a wedge having wedging engagement with the shoes on flat, interengaging faces; a stem of hexagonal cross section projecting inwardly from the wedge and integral therewith; a guide sleeve of hexagonal, interior cross section fixed with respect to the housing and slidingly receiving said hexagonal stem and holding the same against rotation; spring means yieldingly opposing lengthwise movement of the wedge inwardly of the housing; and spring means within the casing yieldingly opposing movement of the wedge and shoes toward the buffer head.

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The following references are of record in the file of this patent:

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