May 20, 1947. G. E. DATH 2,420,701

BUFFER

Filed May 5, 1945 2 Sheets-Sheet 1

Fig. 1.

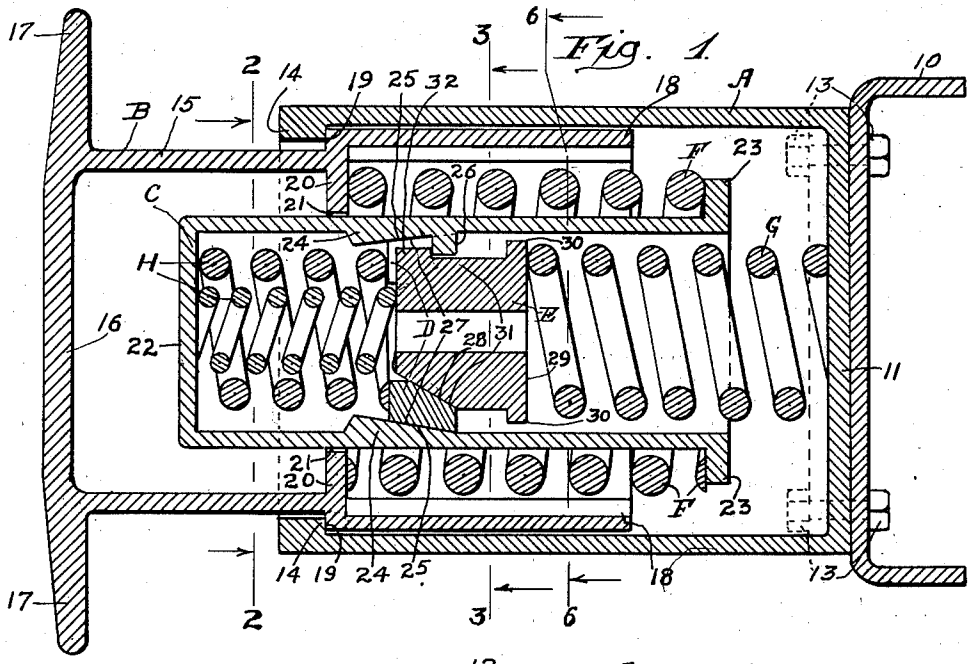


Fig. 2.

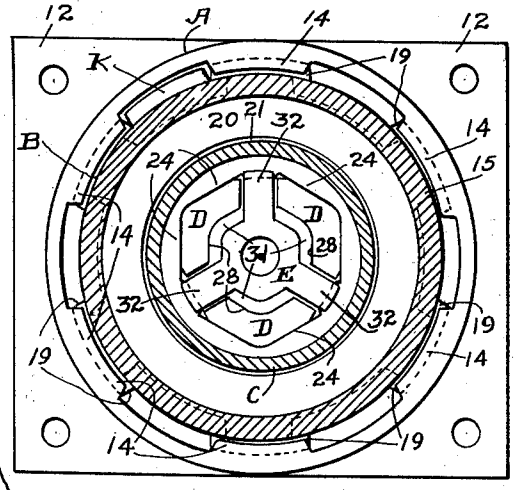
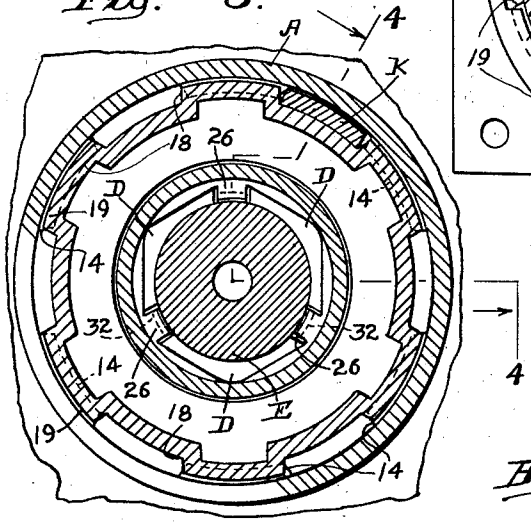


Fig. 3.



Inventor:
George E. Dath.

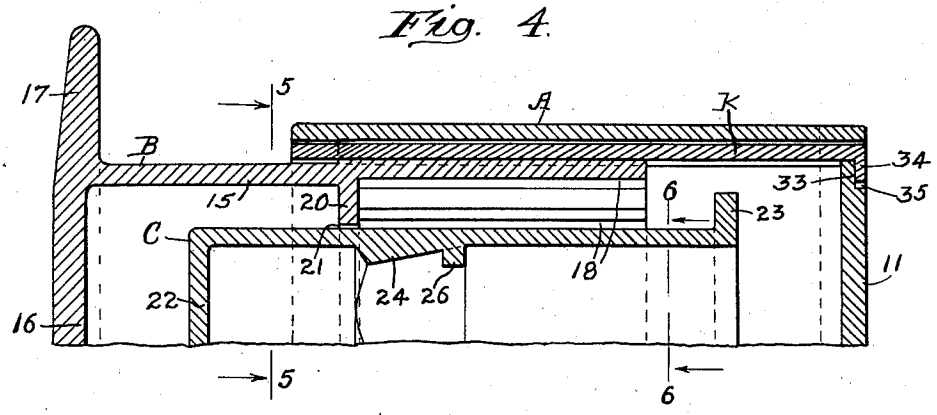
By Henry Fuchs
Atty.

May 20, 1947. G. E. DATH 2,420,701

BUFFER

Filed May 5, 1945 2 Sheets-Sheet 2

Fig. 4.



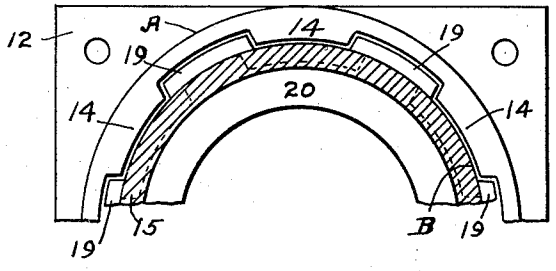


Fig. 5.

Fig. 6.

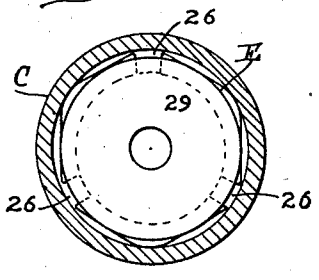
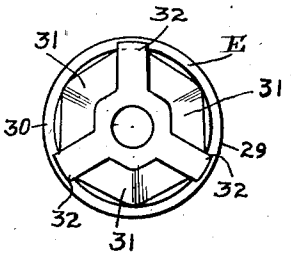


Fig. 7.



Inventor:
George E. Dath.

By Henry Fuchs.
Atty.

Patented May 20, 1947

2,420,701

UNITED STATES PATENT OFFICE

2,420,701

BUFFER

George E. Dath, Mokena, Ill., assignor to W. H. Miner, Inc., Chicago, Ill., a corporation of Delaware

Application May 5, 1945, Serial No. 592,144

2 Claims. (Cl. 213—24)

1

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 preliminary spring action to absorb the lighter shocks to which frictional resistance is added to take care of heavier shocks, wherein the spring action is provided by a plurality of spring members which act cumulatively, thereby providing highly efficient spring action.

A more specific object of the invention is to provide a buffer mechanism for railway cars comprising a housing fixed to the car; a buffer head slidingly telescoped within the housing; a friction casing enclosed within the housing and buffer head; a friction clutch slidingly telescoped within the casing; a spring yieldingly opposing movement of the clutch inwardly of the casing; and spring means yieldingly opposing movement of the buffer head inwardly of the housing, comprising an outer spring member reacting between the buffer head and friction casing and an inner spring member reacting between the friction clutch and housing, the friction casing, together with the friction clutch, thus acting as a column means for transmitting the pressure from the outer to the inner spring member to provide cumulative action of said spring members in opposing inward movement of the buffer head during the initial action of the mechanism.

A further object of the invention is to provide a buffer mechanism as set forth in the preceding paragraph, wherein the friction casing is engaged by the buffer head after a predetermined compression of the mechanism, and positively moved inwardly of the housing to produce relative movement of the friction casing and clutch to provide high frictional resistance during the last part of the compression stroke of the device.

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

In the drawings 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 and 3 are vertical, transverse sectional views, corresponding respectively to the lines 2—2 and 3—3 of Figure 1, the springs being omitted in these views. Figure 4 is a transverse, longitudinal sectional view, corresponding substantially to the line 4—4 of Figure 3, with the springs and friction clutch omitted, said view being partly broken away. Figure 5 is a transverse sectional view, corresponding to the line 5—5 of Figure 4, illustrating the manner of assembling the mechanism, the friction casing being omitted in this view. Figure 6 is a transverse, vertical sectional view, through the friction casing, corresponding substantially to the line 6—6 of Figure 1, the springs being omitted in this view. Figure 7 is a front end elevational view of the wedge block of my improved mechanism looking from left to right in Figure 1.

2

In said drawings, 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, as shown in the drawings, comprises broadly a housing A; a buffer head B; a friction casing C; three friction shoes D—D—D; a wedge block E; two cumulatively acting springs F and G opposing inward movement of the buffer head; a spring resistance H cooperating with the wedge block and shoes; and a retaining key K.

The housing A is in the form of a tubular, cylindrical casing open at its front end and closed at its rear end by a vertical transverse wall 11. The wall 11 is extended laterally outwardly of the sides of the tubular housing A, thereby presenting securing flanges 12—12. The housing A is secured to the end of the car by bolts 13—13 extending through the securing flanges 12 and the end wall 10 of the car. At the forward or open end, the housing A has six inturned stop lugs 14, which are equally spaced circumferentially of the housing.

The buffer head B comprises a tubular, cylindrical shell or sleeve 15 open at its rear end and closed at its front end by a vertical transverse wall 16, which is extended laterally outwardly at the sides of the shell or sleeve, as indicated at 17, to form the buffer head proper of the device. At the rear end portion, the tubular, cylindrical shell 15 is provided with longitudinally extending, radially outwardly offset sections or flutes 18 providing stop shoulders or lugs 19 at their forward ends which cooperate with the stop lugs 14 of the casing A to limit outward movement of the buffer head. The flutes 18 and lugs 19 are six in number and are of such a width that they will pass freely between adjacent lugs 14—14 of

the housing A to facilitate assembling of the mechanism. The cylindrical, tubular shell or sleeve 15 is also provided with an interior, annular abutment flange 20, which is located at the forward ends of the flutes 18 and is in transverse alignment with the lugs 19. The annular flange 20 defines a central opening 21, adapted to accommodate the friction casing C for free movement lengthwise of the mechanism.

The friction casing C comprises a cylindrical, tubular member open at the rear end and closed by a transverse vertical wall 22 at the front end. At the open rear end thereof, the casing C has a laterally outwardly projecting, annular flange 23, which functions as a spring follower element. The side wall of the casing C, at a point between the front and rear ends thereof, is thickened, as indicated at 24. The thickened portion 24 of the casing C defines the friction shell proper of the same and presents three interior friction surfaces 25—25—25 which converge forwardly of the casing. The friction surfaces 25—25—25 are of V-shaped, transverse cross section. The casing C is further provided with three inwardly projecting, interior stop lugs 26—26—26 at the rear ends of the friction surfaces 25—25—25, each stop lug being located between adjacent friction surfaces, that is, the stop lugs 26—26—26 are alternated with the three friction surfaces 25—25—25.

The friction shoes D, which are three in number, are slidingly arranged within the casing C. Each shoe D has a longitudinally extending friction surface 27 on the outer side thereof which is of V-shaped, transverse cross section and engages with the corresponding V-shaped friction surface 25 of the casing. On the inner side, each shoe presents a wedge face 28, which is also of V-shaped, transverse cross section.

The wedge E is in the form of a solid block having a flat vertical rear end face 29 and an outwardly projecting, annular flange 30 at said rear end, having its rear face aligned with the flat rear face 29. At the forward end, the block E is provided with three wedge faces 31—31—31 arranged symmetrically about the central longitudinal axis of the mechanism. Each wedge face 31 is of V-shaped, transverse cross section and engages with the V-shaped wedge face 28 of the corresponding shoe D. At the forward end thereof, the block E has three radially projecting retaining lugs 32—32—32 which are alternated with the wedge faces 31—31—31, that is, each retaining lug 32 is disposed between two adjacent wedge faces. The lugs 32—32—32 are adapted to engage in back of the stop lugs 26—26—26 of the casing C to limit rearward movement of the wedge with respect to the casing and hold the same assembled with the latter.

The spring resistance H, which is disposed within the casing C, comprises inner and outer coils bearing on the end wall 22 of the casing. The inner coil of the spring resistance H has its rear end bearing directly on the front end of the wedge block E and the outer coil has its rear end bearing on the front ends of the three friction shoes D—D—D. The spring resistance H opposes relative movement of the wedge E and casing toward each other and sets up the frictional resistance between the shoes and casing.

The spring F, which is in the form of a helical coil, surrounds the casing C and has its front and rear ends bearing respectively on the flange 20 of the sleeve 15 of the buffer head B and the flange 23 of the casing C.

The spring G, which is also in the form of a helical coil, has its rear end bearing on the transverse end wall 11 of the housing A and extends into the casing C, having its front end bearing on the flat rear end face 29 of the wedge E.

The locking key K is in the form of an elongated, transversely curved plate, which extends through an opening 33 in the rear wall 11 of the housing A and has its front end engaged between two adjacent lugs 14—14 of said housing. The shank or intermediate portion of the key K is engaged between two adjacent flutes 18—18 of the sleeve 15 of the buffer head B and thus locks the buffer head against rotation with respect to the housing A, thereby maintaining the lugs 19—19 of the buffer head in alignment with the lugs 14—14 of the housing A. To prevent accidental removal thereof, the key K is provided with an angularly bent portion at the rear end thereof providing a retaining lug 34, which is seated in a recess 35 at the side of the opening 33 in the wall 11 of the housing A.

In assembling the mechanism, the spring resistance H and the shoes D—D—D are first placed within the casing C and the shoes are forced inwardly to an extent to clear the inner sides of the lugs 26—26—26 of the casing, the shoes being forced inwardly to such an extent that the lugs 32 of the wedge will pass freely between the rear ends of the shoes and the inner sides of the lugs 26. The wedge E is then inserted within the casing C and moved inwardly to an extent to bring the lugs 32 thereof inwardly of the lugs 26. 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 resistance H to expand and force the shoes outwardly into engagement with the wedge with the lugs 32 of the latter disposed between adjacent shoes. As will be evident, outward movement of the wedge is limited by engagement of the lugs thereof with the lugs 26 of the casing. The spring G is next placed within the housing A and the casing C, with the spring F surrounding the same and bearing on the flange 23 of the casing, is then telescoped over the spring G. The buffer head B is then applied to the housing A by telescoping the cylindrical shell or sleeve 15 thereof into the housing, the buffer head B being first turned, as shown in Figure 5, to such a position that the lugs 19 thereof will pass between the lugs 14 of the housing. After the lugs 19 have been brought to a position rearwardly of the lugs 14, the head B is given a partial turn with respect to the housing A to bring the lugs of the former into longitudinal alignment with the lugs of the latter. The buffer head B is then locked against rotation with respect to the housing A by inserting the key K.

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 casing A, compressing the springs F and G cumulatively, the spring F being compressed between the buffer head and the flange 23 of the casing C and the spring G being compressed between the wedge E and the housing A, the frictional resistance of the friction clutch comprising the wedge E and the shoes D—D—D during this

action being sufficient to hold the wedge substantially stationary with respect to the casing C, the casing C thus acting as a pressure transmitting column member to transmit the force directly from the spring F to the spring G. Purely spring resistance is thus provided during the first part of the compression stroke of the mechanism. This action continues until the wall 16 of the buffer head B engages the front end of the casing C and positively forces the casing inwardly of the housing A. When this action occurs, the spring G has been compressed to a sufficient extent to overbalance the frictional resistance between the casing and the friction clutch, the friction clutch thus being compelled to slide within the casing A during the remainder of the compression stroke, thus providing high frictional resistance to absorb the heavier shocks to which the mechanism is subjected. When the actuating pressure or force is removed from the buffer head, the springs F and G and the spring resistance H restore all of the parts to the normal full release position shown in Figure 1, outward movement of the buffer head being limited by the stop shoulders 19 thereof engaging the stop lugs 14 of the housing A, and movement of the wedge E rearwardly with respect to the casing C being limited by engagement of the lugs 32 of the wedge with the lugs 26 of the casing.

I claim:

1. In a buffer for railway cars, the combination with a housing secured to the end of the car; of a buffer head slidingly telescoped within the housing; a friction casing within the housing; a friction clutch slidable within said casing, said clutch including a wedge block; spring means within the casing yieldingly opposing relative movement of the clutch and casing toward each other; a follower flange on said casing; a spring opposing relative movement of the buffer head and casing, said spring surrounding the casing

and bearing at its opposite ends on said buffer head and follower flange of the casing; and a second spring opposing relative movement of the wedge block and housing toward each other, said second spring being seated at one end on said wedge block and bearing at its other end on the housing, the resistance capacity of said last named spring when partly compressed exceeding the combined resistance capacity of said friction clutch and spring means.

2. In a buffer for railway cars, the combination with a housing secured to the end of the car; of a buffer head including a shell open at its rear end, said shell being slidingly telescoped within the housing; a floating friction casing within the housing and extending into the shell of the buffer head, said casing being open at its rear end and closed at its front end; a friction clutch slidable within said casing, said clutch including a pressure transmitting wedge block and friction shoes; means within the casing yieldingly opposing relative movement of the casing and clutch toward each other; cumulatively acting springs within said housing yieldingly opposing inward movement of the buffer head with respect to said housing, one of said springs yieldingly opposing relative movement of the buffer head and casing toward each other, and the other of said springs yieldingly opposing movement of said wedge block inwardly of the housing; and means on said buffer head engageable with said casing after a predetermined compression of the mechanism to force said casing inwardly of the housing in unison with said buffer head, said second named spring being of a capacity to overbalance the resistance to movement offered by said clutch opposed by said yielding means after the mechanism has been compressed to said predetermined extent.

GEORGE E. DATH.