United States Patent

Hawthorne

[15] **3,682,324**

[45] **Aug. 8, 1972**

[54] **END-OF-CAR IMPACT ABSORBING DEVICE**

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[22] Filed: **July 6, 1970**

[21] Appl. No.: **52,265**

[52] **U.S. Cl.** **213/8**, 213/43, 213/69

[51] **Int. Cl.** **B61g 9/12**, B61g 11/12

[58] **Field of Search**.....213/8, 43, 45, 46, 47, 67, 213/22, 62, 64, 69

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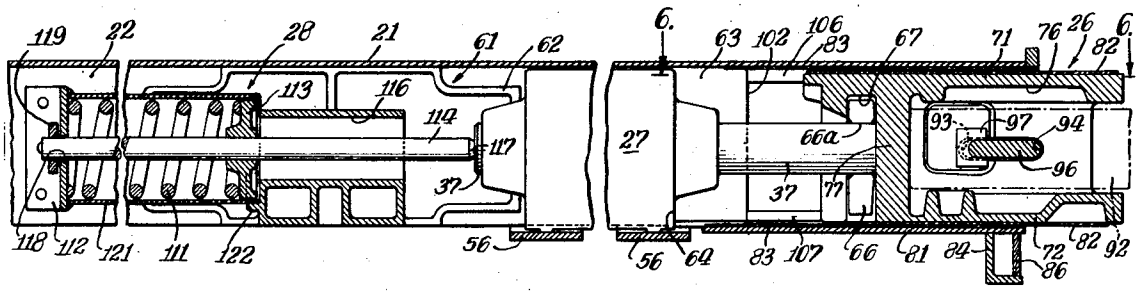
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[57] **ABSTRACT**

An end-of-car impact absorbing device for a railway car comprises a hydraulic piston and cylinder cushioning unit mounted within the sill of the car at one end thereof with a piston rod projecting from opposite ends of the unit. A coupler yoke is detachably connected to one projecting end of the piston rod, and a return spring assembly is removably mounted in the sill behind the unit for coaction with the opposite projecting end of the piston rod. The return spring assembly includes a helical spring enclosed in a tubular guide and a movable spring follower having connecting means engaging the end of the piston rod. Draft spring means may also be provided.

20 Claims, 15 Drawing Figures



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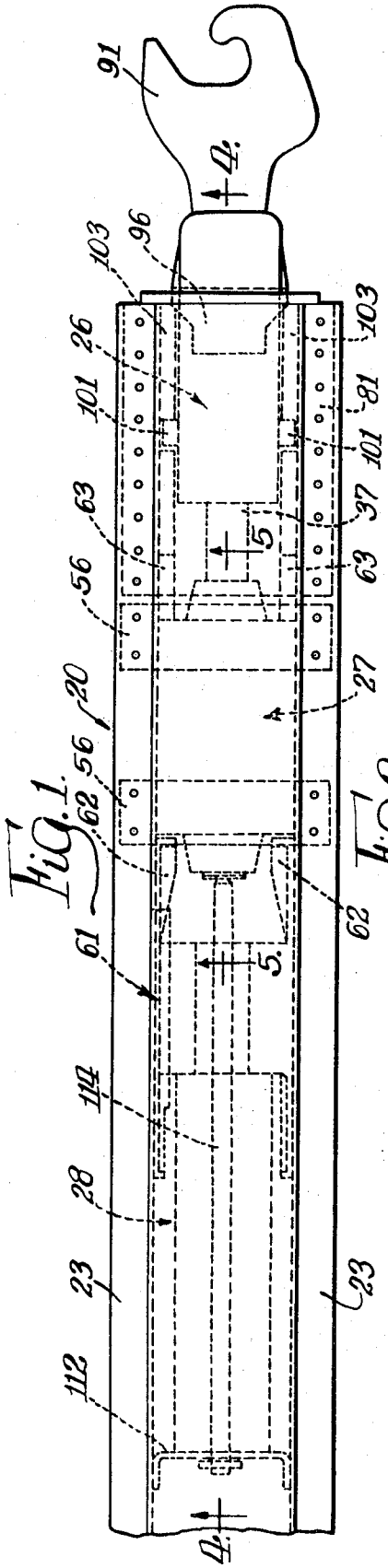


Fig. 1.

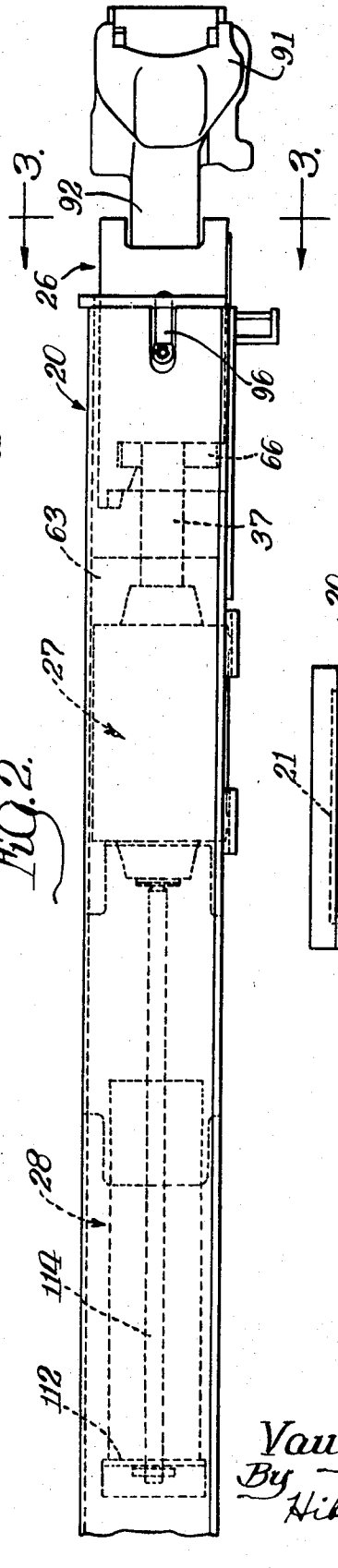


Fig. 2.

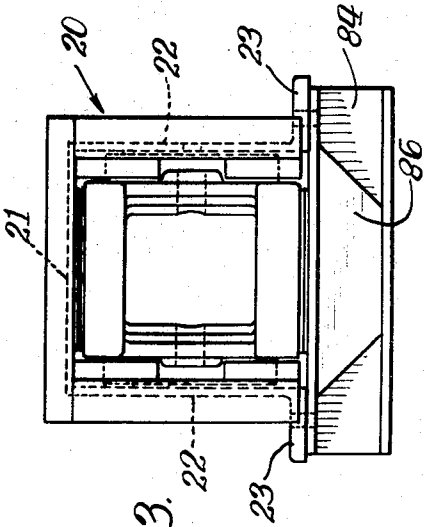


Fig. 3.

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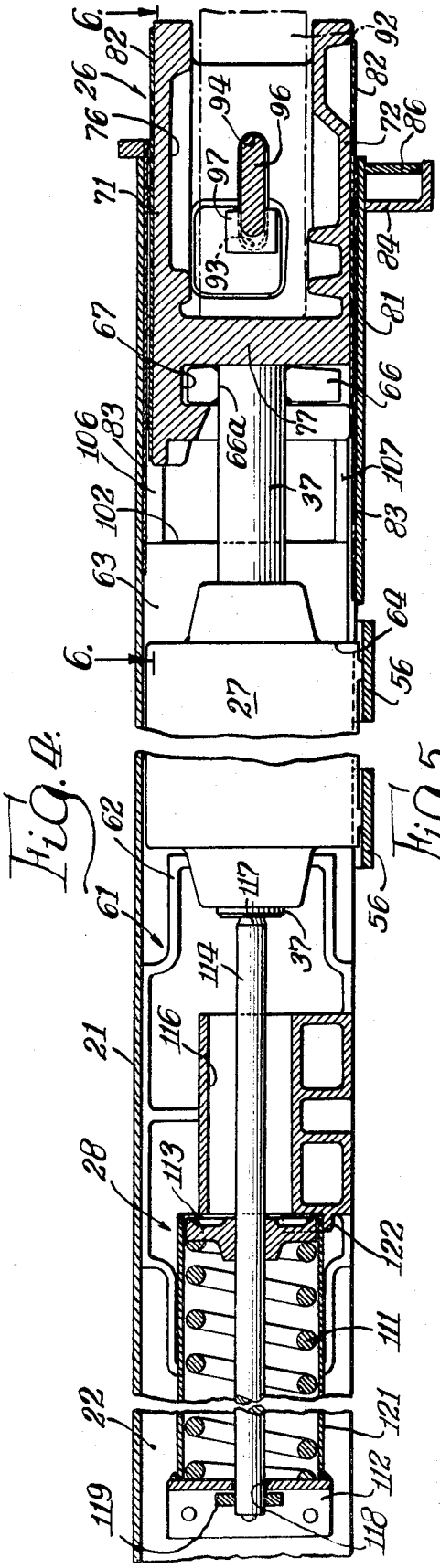


Fig. 4.

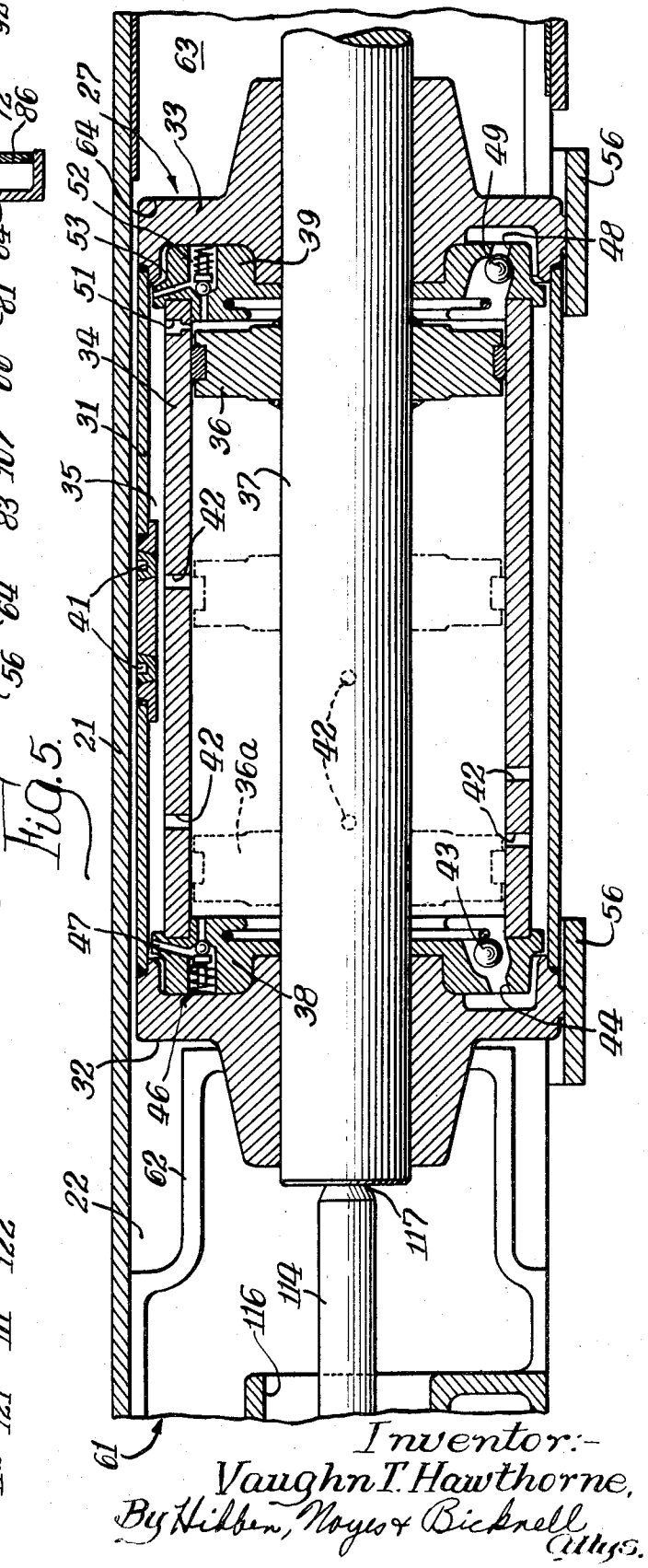


Fig. 5.

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Fig. 6.

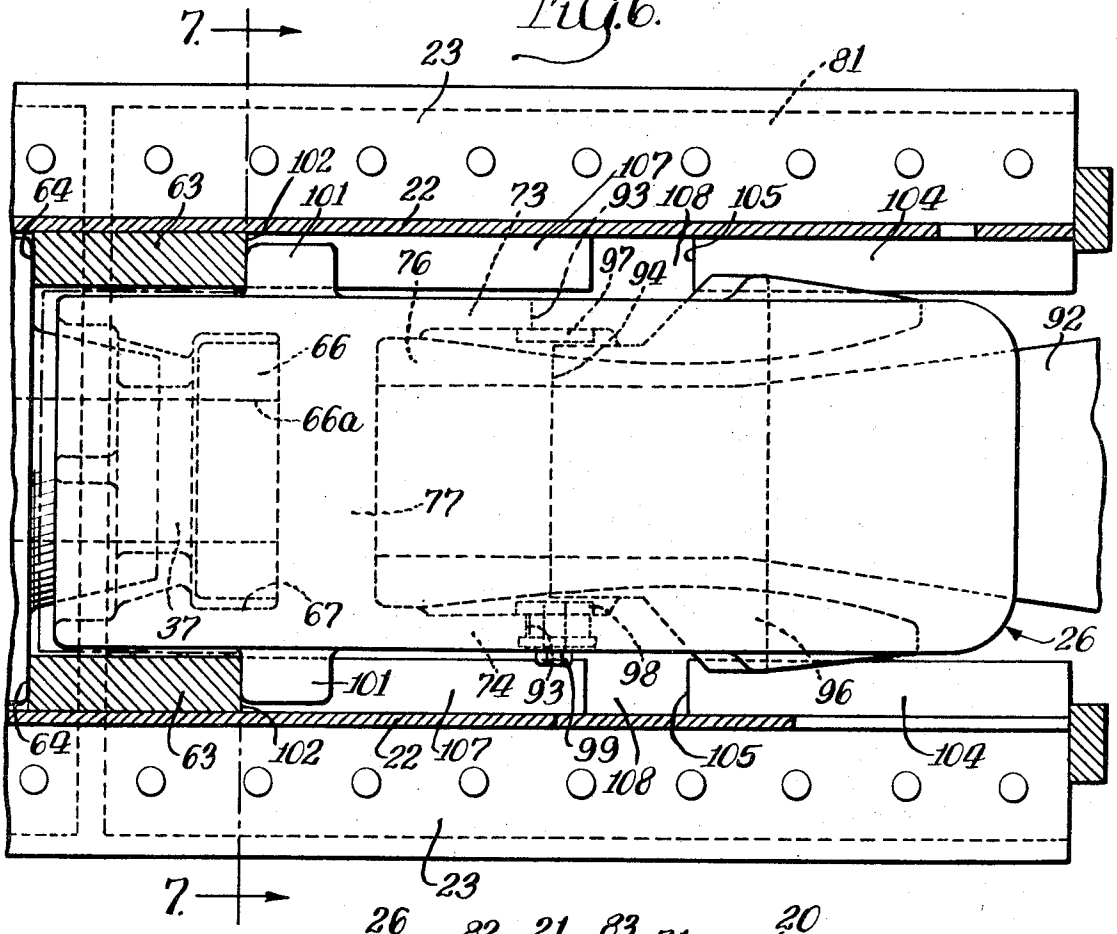
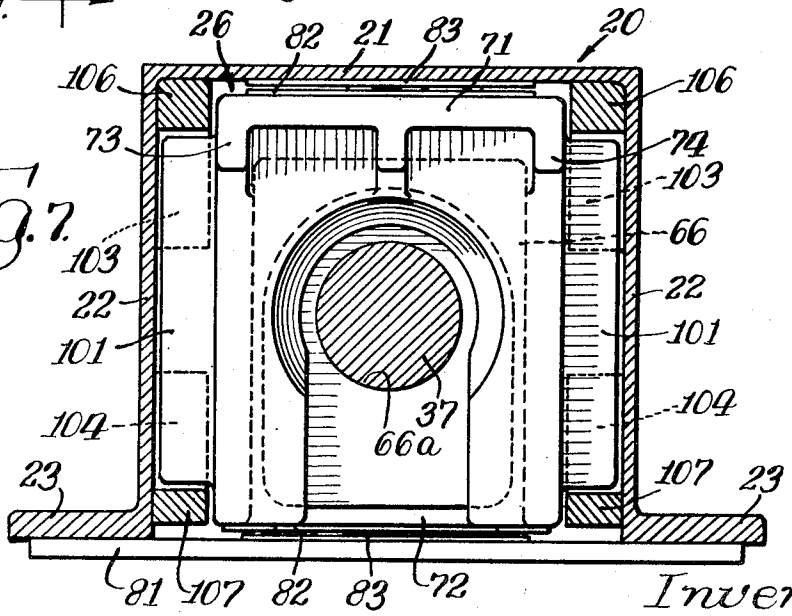


Fig. 7.



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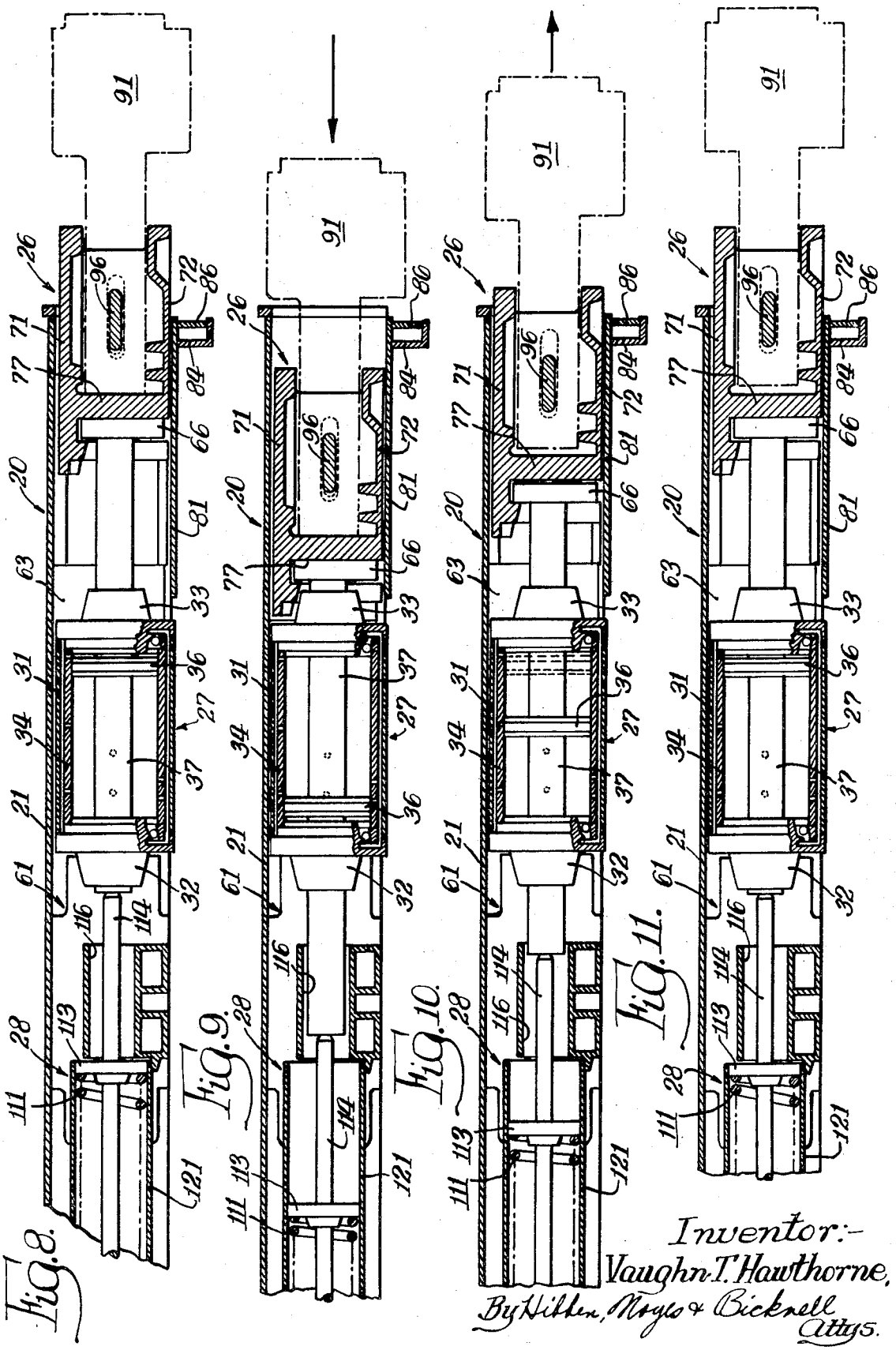


Fig. 8.

Fig. 9.

Fig. 10.

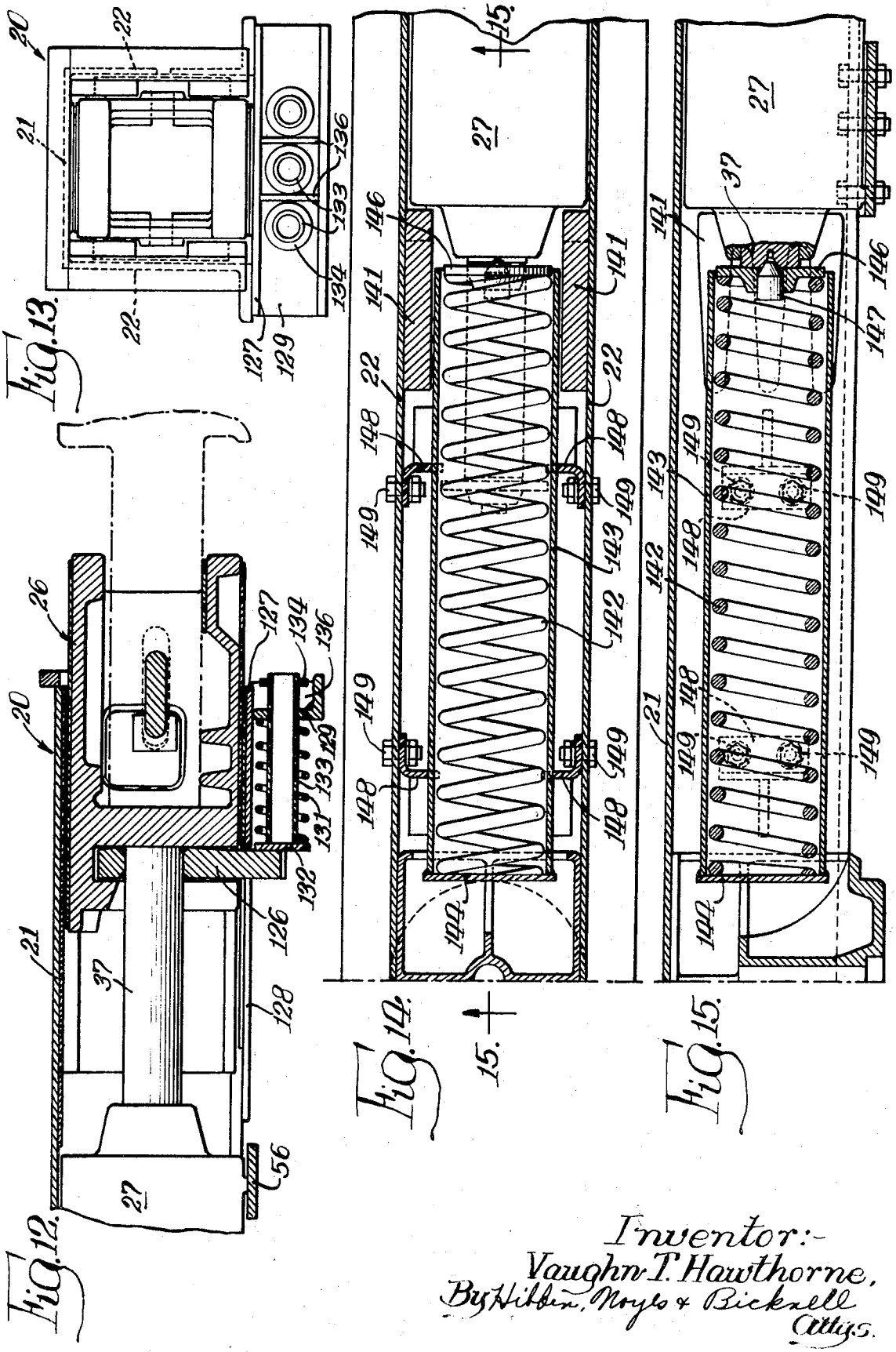
Fig. 11.

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END-OF-CAR IMPACT ABSORBING DEVICE

This invention relates to improvements in a railway car hydraulic cushioning device of the type adapted to be connected to a coupler at one end of the car. In particular, the invention pertains to such an end-of-car cushioning device having a novel and improved return spring assembly cooperable with the piston rod of a hydraulic piston and cylinder cushioning unit.

In end-of-car cushioning devices of the type wherein buff impact forces are absorbed by a hydraulic piston and cylinder unit, it is necessary to provide some means for restoring the unit to its normal position after a buff impact. Some of the prior art end-of-car devices utilize pneumatic or gas return means for restoring the unit to normal position, and other known end-of-car devices rely on one or more internal springs contained within the hydraulic unit. However, for reasons of economy and ease of installation and replacement, it has been found that it is highly desirable to provide a spring return assembly which is separate from the hydraulic unit and which can be removed readily for replacement or repair without removal of the hydraulic cushioning unit. In addition, it has been found to be desirable whenever possible to locate the separate spring return assembly within the sill of the car behind and in longitudinal alignment with the hydraulic unit.

Accordingly, a primary object of the invention is to provide a novel and improved end-of-car cushioning device having a hydraulic piston and cylinder unit and a spring return assembly which is separate from but cooperable with the hydraulic unit, the spring return assembly being readily removable from the car for replacement or service.

Further object of the invention is to provide a novel and improved end-of-car cushioning device of the aforementioned type in which special means are provided for mounting the spring return assembly in the car sill behind and in longitudinal alignment with the hydraulic unit.

Another object of the invention is to provide an end-of-car cushioning device of the foregoing character having novel means for providing an operating connection between the spring return assembly and the piston rod of the hydraulic unit.

An additional object of the invention is to provide an end-of-car cushioning device of the above-mentioned type in which a special internal structure is provided in the sill to accommodate the mounting and operation of the device.

Other objects and advantages of the invention will become apparent from the subsequent detailed description in conjunction with the accompanying drawings, wherein:

FIG. 1 is a plan view of one end of a longitudinal sill of a railway car having mounted therein one specific embodiment of the end-of-car cushioning device comprising the present invention;

FIG. 2 is a side elevational view of the structure shown in FIG. 1;

FIG. 3 is an end view taken along the line 3—3 of FIG. 2;

FIG. 4 is an enlarged fragmentary vertical sectional view taken along the line 4—4 of FIG. 1;

FIG. 5 is an enlarged vertical sectional view through the hydraulic piston and cylinder cushioning unit of the device as taken along the line 5—5 of FIG. 1;

FIG. 6 is an enlarged plan view, partially in section, of the outer end portion of the sill as seen along the line 6—6 of FIG. 4 but showing the position of the structure in full buff impact;

FIG. 7 is a vertical cross-sectional view taken along the line 7—7 of FIG. 6;

FIGS. 8–11 are schematic vertical cross-sectional views showing the successive positions of the cushioning device before, during, and following a buff impact;

FIG. 12 is a fragmentary vertical sectional view showing a modification of the invention;

FIG. 13 is an end elevational view as seen from the right end of FIG 12;

FIG. 14 is a fragmentary horizontal sectional view illustrating another embodiment of the invention; and

FIG. 15 is a vertical sectional view taken along the line 15—15 of FIG. 14.

Referring to FIGS. 1–7, the longitudinally extending center sill of a railway car is designated generally at 20, it being understood that the sill is rigidly connected to the remaining portions of the car underframe structure which are omitted for simplicity. As best seen in FIG. 7, the sill 20 has an inverted, open bottom, channel-shaped configuration including a top wall 21, oppositely disposed side walls 22, and laterally extending flanges 23 at the lower edges of the side walls 22. The end-of-car cushioning device comprising the present invention is mounted within the sill 20 and comprises three principal sections (FIG. 1), namely, a coupler yoke designated generally at 26, a hydraulic piston and cylinder cushioning unit designated generally at 27, and a spring return assembly designated generally 28. As hereinafter described in more detail, the three sections 26, 27 and 28 are operatively interconnected in end-to-end relation, but each section is readily detachable from the other sections and can be removed from the sill for replacement or service independently of the other sections.

As best seen in FIG. 5, the hydraulic piston and cylinder cushioning unit 27 comprises a tubular housing or reservoir 31 extending between a high pressure reservoir head 32 and a low pressure reservoir head 33, a cylinder 34 spaced concentrically from the reservoir 31 to define an annular reservoir space 35 therebetween, and a piston 36 mounted on a piston rod 37. The cylinder 34 extends between a high pressure cylinder head 38 and a low pressure cylinder head 39 which are in interfitting engagement with the reservoir heads 32 and 33, respectively. The piston rod 37 projects from opposite sides of the piston 36 and extends beyond both ends of the unit 27 through the high pressure head assembly 32–38 and the low pressure head assembly 33–39. Thus, the double-ended piston rod arrangement maintains a constant volume relationship within the hydraulic cylinder since as the piston is shifted from one end of the cylinder to the opposite end, the volume of fluid within the cylinder displaced by the piston rod remains exactly the same. A portion of the wall of the reservoir 31 is fitted with removable filler plugs 41 for filling the reservoir and cylinder with a suitable hydraulic fluid.

In FIG. 5, the normal position of the piston 36 is illustrated in full lines at the right-hand end of the cylinder 34. During a buff impact, the piston 36 is displaced to the opposite end of the cylinder 34 as seen in dashed lines at 36*a*. The wall of the cylinder 34 is provided

with a plurality of orifices or metering openings 42 to permit controlled flow of the hydraulic fluid from the interior of the cylinder 34 into the annular reservoir space 35 during buff movement of the piston 36. As is well understood in the art of railway car hydraulic cushioning devices, the orifices 42 have a predetermined size and are arranged in a predetermined pattern axially and circumferentially of the cylinder 34 so as to provide an increasing cushioning effect as the piston 36 moves to its extreme buff position 36a during a buff impact. During buff movement of the piston 36, a ball check valve 43 automatically closes an end port 44 in the high pressure cylinder head 38 so that hydraulic fluid is forced through the metering orifices 42. A normally closed pressure relief valve 46 is also provided in the cylinder head 38 to permit flow of hydraulic fluid from the cylinder 34 through a passage 47 into the reservoir space 35 near the end of the buff travel of the piston 36 when a predetermined increase in pressure of the hydraulic fluid has occurred. The pressure relief valve 46 also provides a safety feature in the event of an excessive pressure rise in the cylinder 34 at any time.

As the piston 36 moves to its buff position 36a, the hydraulic fluid which has been displaced from the cylinder 34 into the reservoir space 35 is returned to the cylinder 34 at the rear side of the piston 36 through an end port 48 having a ball check valve 49 in the low pressure cylinder head 39 and also through a restricted end port 51 in the cylinder 34. Of course, as the piston 36 moves beyond the successive orifices 42 in the cylinder 34, the hydraulic fluid can also return from the reservoir space 35 to the cylinder through the orifices 42 at the rear side of the piston.

Upon completion of the buff stroke of the piston 36, the piston is returned to its normal full line position (FIG. 5) by means of the spring return assembly 28, as described below. During this return movement of the piston 36, the ball check valve 43 shifts to its open position shown in FIG. 5 to permit return flow of hydraulic fluid from the reservoir space 35 through the open port 44 into the cylinder. During the return stroke, hydraulic fluid at the rear side of the piston is also forced through the orifices 42 into the reservoir space 35, and as successive orifices 42 are uncovered at the forward side of the piston, the hydraulic fluid can also return to the cylinder through these orifices. Of course, during the return stroke of the piston 36, the ball check valve 49 closes the port 48, and during the latter portion of the return stroke after the piston has moved beyond the last of the orifices 42, a controlled draft movement of the piston at substantially constant pressure is provided by displacement of the fluid at the rear side of the piston solely through the restricted cylinder port 51 into the reservoir space 35. A pressure relief valve 52 is also provided in the cylinder head 39 to permit restricted return of hydraulic fluid from the cylinder through a passage 53 into the reservoir space 35. During return movement of the piston 36 following a buff impact, the valve 52 normally remains closed, but during running the port 51 provides the desired degree of train handling and the valve 52 functions to avoid excessive pressure increases. Although only a single ball check valve 43 and a single ball check valve 49 are shown in FIG. 5, it should be understood that a plurality of check valve controlled ports will usually be provided in the cylinder heads 38 and 39 for the purposes described.

The hydraulic unit 27 is removably supported in the sill 20 by means of a pair of transverse support plates 56 (FIG. 1) bolted to the undersides of the sill flanges 23 and underlying the reservoir heads 32 and 33. The hydraulic unit 27 supported on the underlying support plates 56 is held in substantially fixed relation within the sill 20 by means of suitable abutment structures rigidly affixed to the sill at opposite ends of the hydraulic unit. Thus, a bolster center filler casting 61 (FIG. 4) is rigidly secured within the sill 20, as by welding, between the hydraulic unit 27 and the spring return assembly 28. One end of the bolster center filler 61 is provided with integral longitudinal extensions 62 which are disposed along the side walls 22 of the sill and which terminate in inwardly extending abutment surfaces closely adjacent the high pressure head end of the hydraulic unit 27 (FIG. 1) for retaining the hydraulic unit during a buff impact. At the opposite end of the hydraulic unit 27 a pair of stop plates 63 (FIG. 6) are rigidly affixed, as by welding, to the sill walls 22. The vertical edges 64 of the stop plates 63 abut the low pressure head end of the hydraulic unit 27 so as to retain the latter during the time that draft forces are imposed on the hydraulic unit. As will be evident, particularly from FIG. 4, the distance between the abutments 62 and the stop edges 64 is slightly greater than the corresponding dimension of the hydraulic unit 27 in order to facilitate installation and removal of the hydraulic unit.

The end of the piston rod 37 which projects through the low pressure head end of the hydraulic unit 27 has rigidly secured to its outer extremity a rod end member 66 (FIG. 4) which interfits with a recess 67 in the adjacent end of the yoke 26. As seen in FIGS. 4, 6 and 7, the yoke 26 comprises a casting having an elongated generally boxlike configuration including a top wall 71, a bottom wall 72, and side walls 73 and 74 which define a cavity 76 for receiving the coupler stem. The yoke casting 26 has a transverse wall 77 defining the inner end of the cavity 76. The top wall 71 and the side walls 73 and 74 extend longitudinally from the wall 77 and thence inwardly of the sill to provide overhanging lip portions which define the recess 67 extending partially around the peripheral edge of the member 66. It will be noted that the recess 67 is open and unobstructed at the bottom of the yoke 26 so as to facilitate a detachable interconnection of the yoke 26 with the rod end member 66.

A yoke carrier plate 81 is bolted to the sill flanges 23 and extends across the open bottom of the sill beneath the yoke 26 for slidably supporting the latter (FIG. 1). Suitable wear plates 82 (FIG. 7) are affixed to the top and bottom walls of the yoke 26 for sliding engagement with cooperating wear plates 83 affixed to the sill top wall 21 and the yoke carrier plate 81. Structural strengthening of the outer end of the yoke carrier plate 81 is provided by means of a depending angle member 84 (FIG. 4) secured transversely across the bottom of the sill 20 and a brace plate 86 secured between the carrier plate 81 and the lower leg of the angle member 84 (FIGS. 3 and 4).

A conventional type E coupler 91 has a stem portion 92 which extends into the yoke cavity 76 abutting the

wall 77 (FIGS. 4 and 6). The side walls 73 and 74 of the yoke are provided with the conventional elongated slots 93 aligned with a corresponding slot 94 in the coupler stem 92 for receiving the conventional draft key 96, thereby interconnecting the coupler 91 with the yoke 26. A key stop 97 is affixed to the yoke side wall 73 and overlies an end portion of the yoke slot 93 so as to retain the draft key 96 in engaged position. In a corresponding location at one end of the slot 93 in the opposite yoke side wall 74, a movable retainer plate 98 is affixed by means of a bolt 99 so that the draft key 96 can be inserted through the aligned slots 93–94 and held in secured relation by the plate 98 and bolt 99.

During a buff impact against the coupler 91, the forces are transmitted directly from the coupler stem 92 to the yoke 26 and thence to the end of the piston rod 37 which extends through a hole 66*a* in the rod end member 66. The hydraulic cushion unit 27 functions to provide the desired cushioning effect during the buff impact, and eventually when the piston 36 reaches its full buff position, as at 36a in FIG. 5, the oversolid forces are imposed directly against the sill of the car by means of a pair of massive integral side projections or ears 101 (FIG. 6) extending outwardly from the yoke side walls 73 and 74 adjacent the transverse wall 77. As best seen in FIG. 6, in full buff position of the device, the ears 101 abut the vertical edges 102 of the stop plates 63 so that oversolid forces are not imposed on the hydraulic unit 27. A pair of upper and lower draft stops 103 and 104 (FIG. 7) are rigidly secured to the sill side walls 22 adjacent the outermost end of the sill in longitudinally spaced relation from the stop plates 63. The yoke projections 101 abut the inner edges 105 of the draft stops 103–104 in the normal or full draft position of the hydraulic unit. Thus, oversolid forces in both buff and draft are transmitted directly from the yoke ears 101 to the sill 20 without being imposed on the hydraulic unit 27. Elongated upper and lower yoke guides 106 and 107 extend between the buff and draft stops for guiding the sliding movement of the yoke projections 101. As seen in FIG. 6, a gap 108 is provided between each of the lower yoke guides 107 and the lower draft stops 104 to facilitate assembly of the yoke 26 in the sill 20, the gaps 108 being wide enough to permit insertion of the yoke projections 101 upwardly therethrough.

The return spring assembly 28 comprises a cylindrical helical compression spring 111 (FIG. 4) which is disposed in coacting relation between a generally U-shaped bracket 112 at one end of the spring 111 and a movable disk-shaped spring follower 113 at the opposite end of the spring 111. The bracket 112 is rigidly but detachably secured to the side walls 22 of the sill, as by screws or bolts. The follower 113 is rigidly carried on an elongated spring rod 114 which extends through an elongated central tubular passage 116 provided in the bolster center filler 61. As seen in FIG. 4, the right-hand end of the spring rod 114 abuts the left-hand projecting end of the piston rod 37, and the outermost end of the spring rod 114 is preferably tapered, as at 117, to fit in a cooperating recess (not shown) in the axial end of the piston rod. Thus, the piston rod 37, the spring 111, and the spring rod 114 are disposed in coaxial alignment, and the spring rod 114 provides a rigid detachable connection between the movably spring follower 113 and the piston rod 37. At its opposite end, the spring rod 114 extends from the follower 113 in slidable relation through an aperture 118 in the bracket 112, and a retainer 119 is affixed to the outer extremity of the spring rod 114.

An elongated guide tube 121 encloses the spring 111 and the follower 113 which is slidable in the guide tube 121. One end of the guide tube 121 is rigidly affixed, as by welding, to the bracket 112, and the opposite end of the guide tube 121 is detachably supported coaxially with the passage 116 by an arcuate shelf or ledge portion 122 (FIG. 4) which projects axially from the center structure of the bolster center filler 61. If desired, the end of the guide tube 121 may be received between a plurality of circumferentially spaced projections on the bolster center filler 61. Thus, the guide tube 121 can be readily disconnected from the bolster center filler 61 and the spring rod 114 can be readily disengaged from the piston rod 37 so that the return spring assembly 28 can be removed quite easily as a unit from the sill 20 merely by detaching the bracket 112 from the sill.

FIGS. 8–11 show the successive positions of the mechanism before, during and following a buff impact. Thus, FIG. 8 shows the normal position of the device (as also shown in full lines in FIG. 5) wherein the spring 111 acting through the follower 113 and the spring rod 114 urges the piston rod 37 to its extreme right-hand position. As heretofore pointed out, this is the normal or full draft position of the device in which the piston 36 is disposed adjacent the right-hand end of the cylinder 34 and the yoke projections 101 abut the edges 105 of the stop members 103 and 104. FIG. 9 illustrates the position of the device upon completion of a buff impact against the coupler 91 as indicated by the arrow. The cushioning action of the hydraulic unit during a buff impact has already been described, and it will be noted from FIG. 9 that the piston rod 37 has been projected axially from the left-hand end of the hydraulic unit 27. The central passage 116 provided by the special center structure of the bolster center filler 61 accommodates the leftward displacement of the piston rod 37, and the spring rod 114 and the follower 113 are likewise displaced to the left within the guide tube 121, thereby compressing the spring 111 between the follower 113 and the bracket 112. As heretofore pointed out in connection with FIGS. 5 and 6, at the conclusion of the buff stroke the piston 36 is spaced slightly from the end of the cylinder, and the oversolid forces are imposed directly on the sill 20 by engagement of the yoke projections 101 with the stop surfaces 102. After the buff forces have been released, the spring 111 urges the piston rod 37 and the piston 36 to the right toward normal position of the device as shown by the arrow in FIG. 10. As heretofore described, after the piston 36 has traversed the metering orifices 42 in the cylinder wall, as shown approximately in FIG. 10, further draft movement of the piston 36 to its final position is effectively controlled by the restricted port 51 at the right-hand end of the cylinder. FIG. 11 shows the final position at the end of the draft stroke and corresponds to the normal position of the device shown in FIG. 8.

Preferably, the spring 111 is maintained in a precompressed condition between the bracket 112 and the follower 113 so as to insure full return of the hydraulic

cushion unit 27 to its normal position even when there is resistance against the coupler to the final draft movement of the mechanism, e.g. under squeeze conditions wherein the weight of one or two connected cars must be moved by the spring 111 to insure full draft return of the hydraulic mechanism.

FIGS. 12 and 13 show a modification of the device heretofore described in which a draft spring means is provided to further cushion draft movement of the mechanism. Thus, the rod end member secured to the outer extremity of the piston rod 37 is designated at 126 and extends downwardly below the yoke 26 and the sill 20. The yoke carrier plate, designated at 127, has an elongated slot 128 to accommodate movement of the lower extension of the rod end member 126. The outer end portion of the carrier plate 127 is reinforced by an angle member 129, and a plurality of draft springs 131 extend in parallel arrangement between the angle member 129 and a retainer plate 132 affixed to the lower extension of the rod end member 126. A tubular guide member 133 is disposed within each of the draft springs 131, the guide tubes 133 being rigidly affixed to the retainer plate 132 and extending slidably through apertures in the angle member 129. Retainer flanges 134 are secured to the outermost ends of the guide tubes 133, and a pair of vertical braces 136 are secured between the carrier plate 127 and the bottom leg of the angle 129 in between adjacent pairs of draft springs. As will readily be understood, the draft springs 131 are compressed during the final portion of the draft movement of the piston 36 in the hydraulic unit 27 to provide additional draft cushioning, thereby insuring improved train handling under all railroad conditions.

FIGS. 14 and 15 illustrate another embodiment of the spring return assembly which is particularly adapted for use in certain types of cars wherein the spring return assembly can be located closely adjacent the hydraulic unit without the necessity of an elongated spring rod (such as the rod 114 of the previously described embodiment) to provide an operating connection between the spring return assembly and the end of the piston rod of the hydraulic unit. Thus, is FIGS. 14 and 15, the hydraulic unit 27 is mounted in abutting relation with a pair of buff stops 141 rigidly affixed to the sill side walls 22. A cylindrical helical compression spring 142 is housed within an elongated tubular guide 143 having a rigid end closure 144 at one end of the spring 142. A movable spring follower 146 is disposed at the opposite end of the spring 142, and a short connecting pin 147 is rigidly mounted in a central aperture in the follower 146. As shown in FIG. 15, the outer end of the central connecting pin 147 is tapered and is detachably received in a complementary tapered recess in the end of piston rod 37. In this embodiment, the enclosing guide tube 143 for the spring 142 is detachably mounted in the sill by means of a plurality of angular brackets 148 which fit in suitable apertures intermediate the ends of the guide tube 143 and are secured to the sill side walls 22 by means of bolts 149. The spring 142 functions in the same manner as described in connection with the first embodiment of the invention, and during a buff impact the piston rod 37 projects into the tubular guide 143 as shown in dashed lines in FIG. 14.

As will be seen from the foregoing description, the present invention provides a novel and improved spring return assembly in which the compression spring is located behind and in longitudinal alignment with the hydraulic unit for coaction with the projecting end of the piston rod during a buff impact. Consequently, during the compression and subsequent extension of the spring, the force of the spring is exerted on the piston rod in a straight axial direction so as to minimize wear. Furthermore, the spring return assembly is located entirely within and is protected by the sill structure of the car so that the mechanism is substantially less vulnerable to damage, e.g. during a derailment, as compared with other types of spring return arrangements located externally of the sill. The tubular guide member surrounding the return spring provides improved spring life since the engagement of the guide with the spring always occurs around the outer periphery of the spring which is under less stress than the interior portions of the spring. Also, as heretofore pointed out, the return spring assembly of the present invention is separate from the hydraulic unit and can readily be removed from the sill for replacement or service without the necessity of removing the hydraulic unit or other portions of the mechanism.

Although the invention has been described with particular reference to certain structural embodiments thereof, it is to be understood that various modifications and equivalents may be resorted to without departing from the scope of the invention.

I claim:

1. An end-of-car impact absorbing device for a railway car comprising, in combination:
- an underframe structure including a longitudinally extending sill rigid with said structure;
- an impact absorbing hydraulic piston and cylinder cushioning unit mounted within said sill adjacent an end of the car, said unit having a unitary piston rod projecting from opposite ends thereof;
- a coupler yoke detachably connected to one end only of said piston rod and slidably supported in said sill, said yoke having means for operatively connecting the same to a coupler at the end of the car; and
- a return spring assembly within said sill including spring means operatively engaging the opposite end only of said piston rod, said spring means being compressible in response to travel of said opposite end of said piston rod outwardly from said unit during a buff impact against the coupler for restoring said piston, said piston rod, and said yoke to normal position.

2. The device of claim 1 further characterized in that said spring means comprises a cylindrical helical spring disposed lengthwise in said sill in end-to-end coaxial relation with said piston rod.

3. The device of claim 1 further characterized in that said return spring assembly comprises at least one helical compression spring disposed lengthwise in said sill adjacent the opposite end of said piston rod, retainer means in said sill engaging one end of said spring, movable follower means engaging the opposite end of said spring, and connecting means providing an operating connection between said movable follower means and said opposite end of said piston rod.

4. The device of claim 3 further characterized in that said spring is enclosed within a tubular guide member, said retainer means being disposed at one end of said guide member, and said movable follower means being slidable within said guide member.

5. The device of claim 3 further characterized in that said spring is disposed in axially spaced relation from said unit, and said connecting means comprises an elongated member extending rigidly from said movably follower means and detachably engaging said opposite end of said piston rod.

6. The device of claim 5 further characterized in that said piston rod, said spring, and said elongated member are disposed in coaxial alignment.

7. The device of claim 5 further characterized in that said spring is enclosed within a tubular guide member, and said retainer means comprises a bracket rigidly attached to said sill and retaining one end of said guide member and said one end of said spring, said follower means being slidable in said guide member.

8. The device of claim 3 further characterized in that said spring is disposed coaxially with said piston rod, said opposite end of said piston rod has an axial end recess and said follower means is disposed closely adjacent thereto, and said connecting means comprises a center pin projecting rigidly from said follower means and detachably received in said recess.

9. The device of claim 8 further characterized in that said center pin has a tapered outer end and said recess has a complementary tapered configuration.

10. The device of claim 3 further characterized in that said spring is enclosed within a tubular guide member, and a plurality of brackets are provided within said sill detachably mounting said guide member intermediate the ends thereof, said retainer means comprising a rigid end closure on said guide member, and said movable follower means being slidable within said guide member.

11. The device of claim 1 further characterized in that a bolster center filler is rigidly mounted in said sill, one end of said bolster center filler extending adjacent an end of said cushioning unit for retaining the latter during a buff impact, and said bolster center filler having central passage means for receiving said opposite end of said piston rod during a buff impact.

12. The device of claim 11 further characterized in that said return spring assembly comprises a cylindrical helical spring disposed in coaxial alignment with said opposite end of said piston rod, a tubular guide member surrounding said spring, retainer means in said sill retaining one end of said spring remote from said unit, movable follower means engaging the opposite end of said spring and slidable in said guide member, and an elongated connecting member extending through said central passage means and providing a rigid connection between said follower means and said opposite end of said piston rod.

13. The device of claim 12 further characterized in that one end of said guide member is retained by said retainer means and the opposite end of said guide member is supported by said bolster center filler in axial alignment with said central passage means.

14. The device of claim 13 further characterized in that said retainer means comprises a bracket detachably affixed to said sill, said one end of said guide member is rigidly secured to said bracket, and said opposite end of said guide member is removably supported on a ledge portion projecting from said bolster center filler, whereby said return spring assembly is readily removable from said sill upon detachment of said bracket.

15. A return spring assembly for use in a railway car still having a piston and cylinder cushioning unit mounted therein with one end of the piston rod movable outwardly from the unit in response to a buff impact against the end of the car, said assembly comprising:

a cylindrical helical compression spring;

a tubular guide member enclosing said spring and adapted to be mounted lengthwise in the sill in axial alignment with the piston rod;

retainer means adapted to hold one end of the spring in fixed relation to the sill;

movable follower means engaging the opposite end of the spring and slidable in said guide member; and

connecting means rigidly affixed to said follower means and adapted to engage the end of the piston rod for compressing the spring in response to movement of the piston rod during a buff impact.

16. The assembly of claim 15 further characterized in that said guide member and said spring are adapted to be mounted in the sill with said follower means in axially spaced relation from said unit, and said connecting means comprises an elongated rod extending rigidly from said follower means.

17. The assembly of claim 15 further characterized in that said guide member and said spring are adapted to be mounted in the sill with said follower means closely adjacent said unit, and said connecting means comprises a center pin projecting rigidly from said follower means and adapted to have its outer end detachably received in a recess in the end of the piston rod.

18. The assembly of claim 17 further characterized in that said outer end of said pin is tapered for engagement in a complementary recess in the end of the piston rod.

19. The assembly of claim 15 further characterized in that said retainer means comprises a bracket adapted to be detachably mounted on the sill, and said guide member has one end thereof rigidly affixed to said bracket.

20. The assembly of claim 15 further characterized in that said retainer means comprise a rigid end closure on one end of said guide member, and a plurality of brackets are provided for detachably mounting said guide member intermediate its ends.

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