

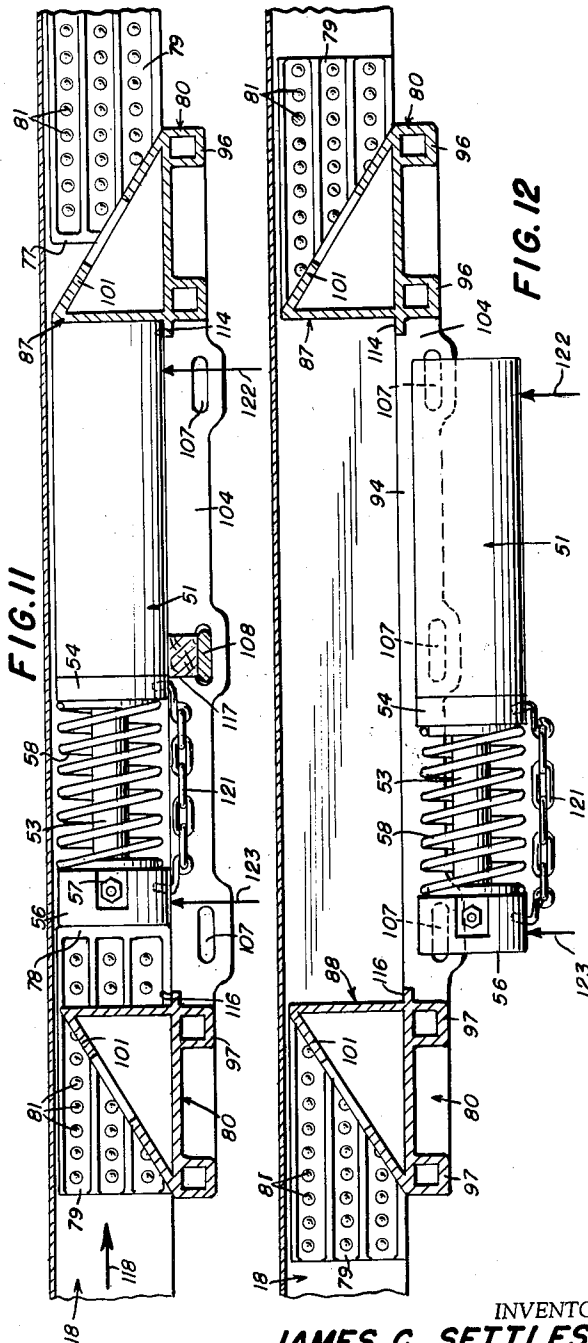
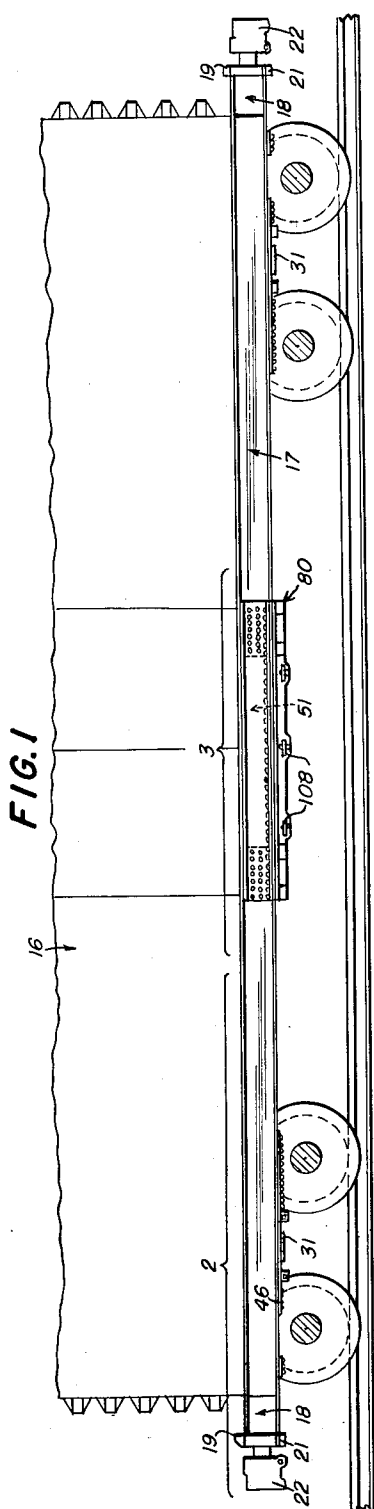
April 3, 1962

J. C. SETTLES ET AL
UNDERFRAME STRUCTURE AND CUSHION MECHANISM
FOR RAILWAY VEHICLES

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5 Sheets-Sheet 1



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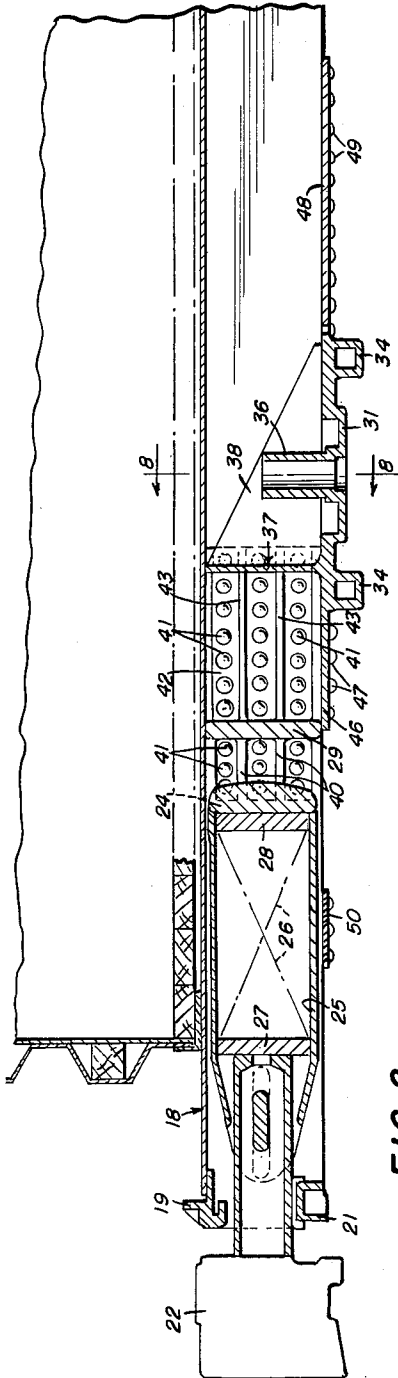


FIG. 2

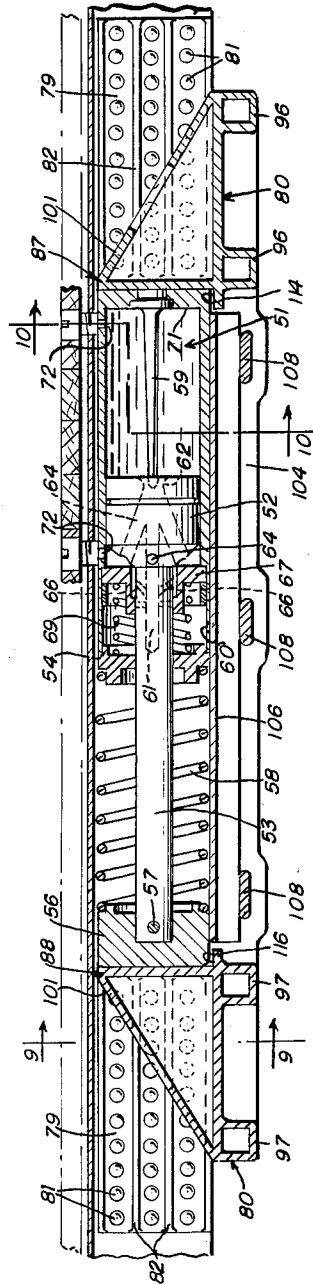


FIG. 3

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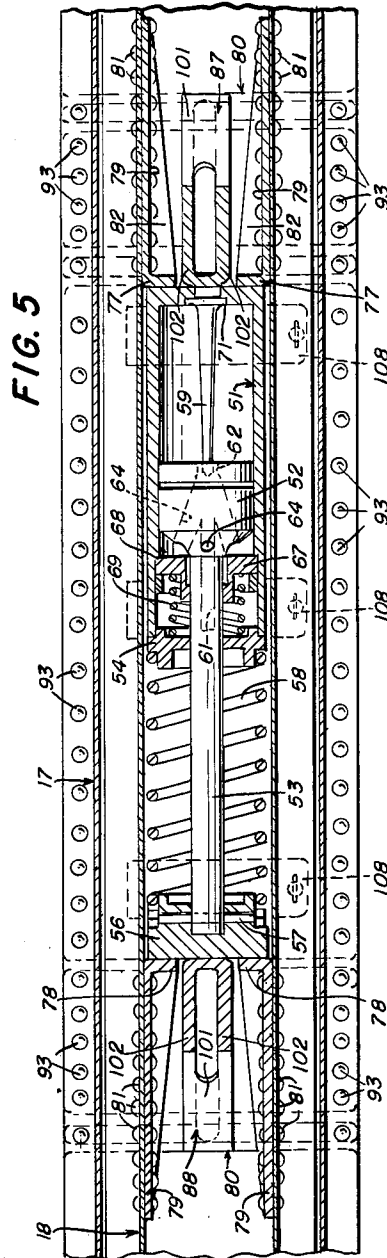
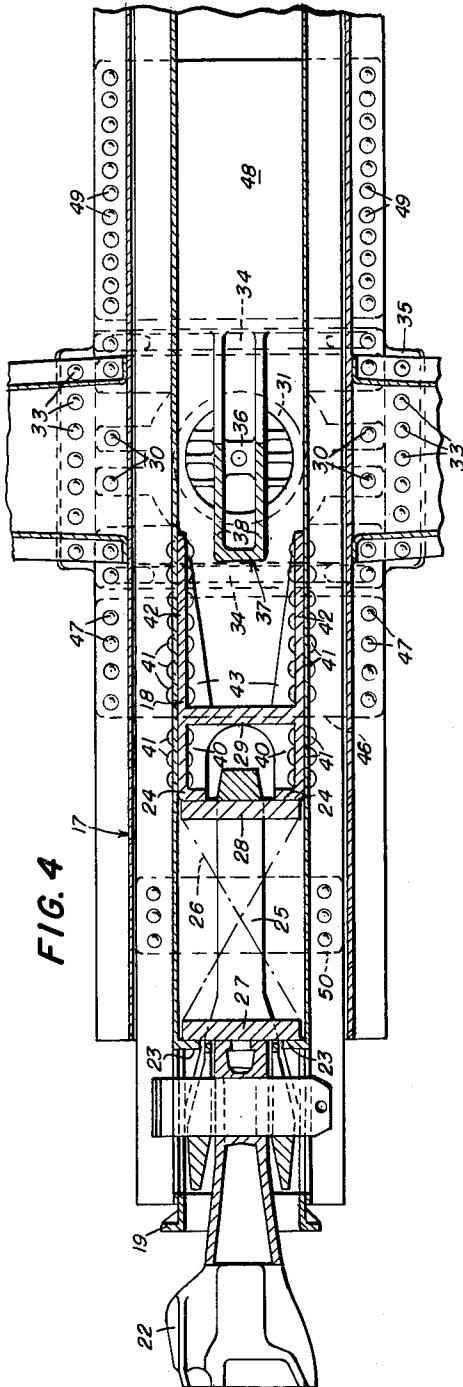
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5 Sheets-Sheet 3



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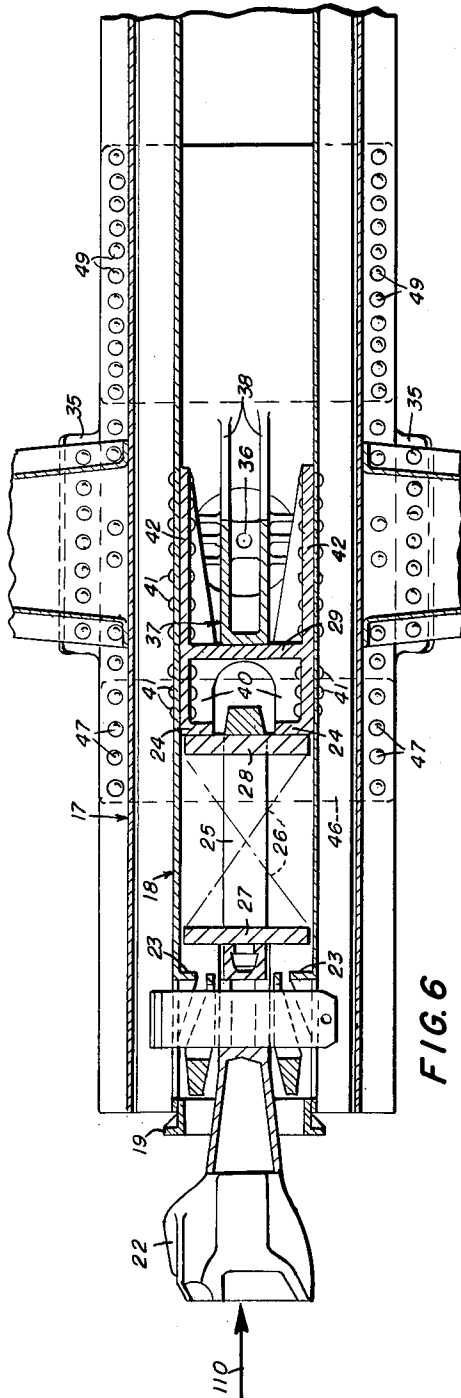
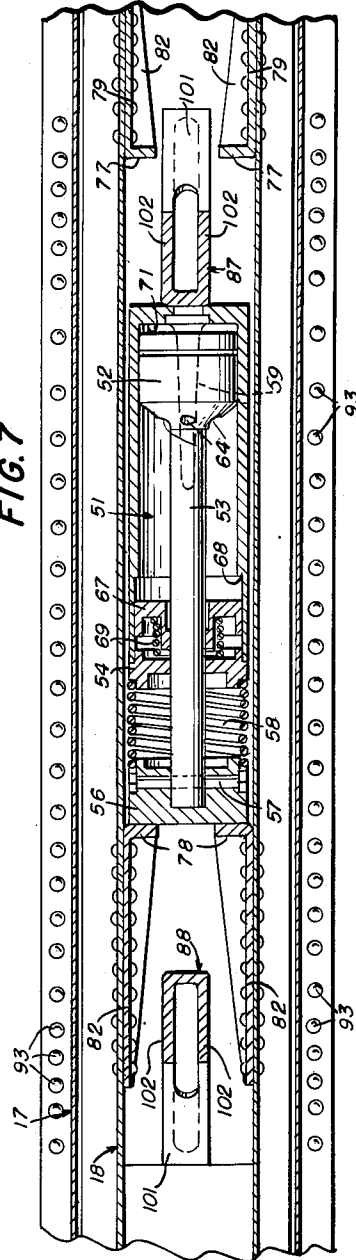


FIG. 6

FIG. 7



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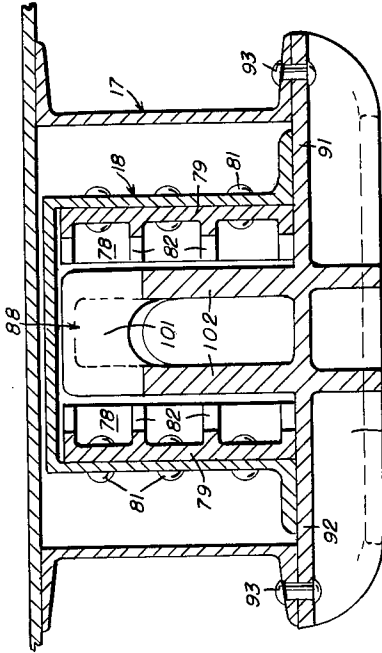


FIG. 9

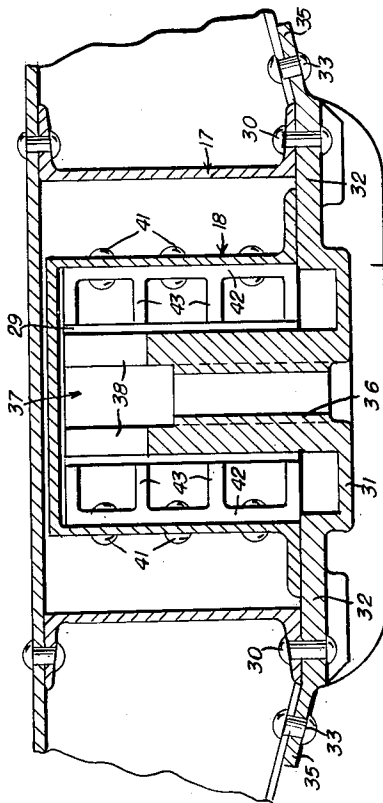


FIG. 8

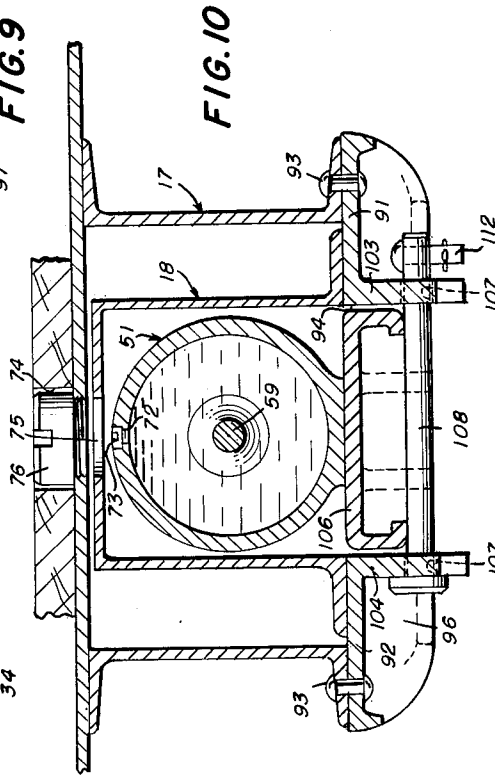


FIG. 10

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3,028,019

UNDERFRAME STRUCTURE AND CUSHION MECHANISM FOR RAILWAY VEHICLES

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Filed Feb. 3, 1960, Ser. No. 6,499

10 Claims. (Cl. 213—8)

The present invention relates to liquid cushioning means in association with the couplers and draft riggings of railway freight cars to provide means for absorbing and dissipating the kinetic energy inherent in collisions which occur during coupling operations between railway vehicles, in train operation or in switching and humping operations and the invention more specifically relates to improvements in the elements forming parts of the underframe structure and parts making up the cushioning means.

It is known to provide an auxiliary sill structure which is arranged to move longitudinally relative to a sill structure fixed to a railway vehicle body and to provide hydraulic means actuated in response to relative movements of the two sill structures to cushion and absorb the energy of an impact applied to either coupler. It is an object of the present invention to provide improvements in such mechanisms and particularly the hydraulic mechanism and the means for supporting and maintaining the liquid cushioning device in operative association with the sill structures.

Another object of the invention is to provide a casting of unique construction which serves as abutments for opposite ends of the hydraulic mechanism and which is so designed that the liquid cushioning device is supported in operative relationship with the sill structures and may be readily removed from the railway vehicle body and from the presence of the sill structures.

Another object of the invention is to provide improvements in the center post structure and its cooperation with the other elements of the sill structures.

Other and further objects and features of the invention will be appreciated and become apparent to those skilled in the railway draft appliance art as the present disclosure proceeds and upon consideration of the following detailed description taken in conjunction with the accompanying drawings wherein an embodiment of the invention is disclosed.

In the drawings:

FIG. 1 is a side elevational view of the lower portion of a railway freight car provided with an impact energy absorbing mechanism and underframe structure exhibiting the invention.

FIG. 2 is a vertical section on a larger scale taken along the longitudinal center of the sill assembly showing the portion indicated at 2 in FIG. 1.

FIG. 3 is a similar sectional view of a portion of the mechanism indicated at 3 in FIG. 1.

FIG. 4 is a sectional plan view of the sill assembly and that portion of the mechanism shown in FIG. 2.

FIG. 5 is a sectional plan of the portion of the energy absorbing mechanism shown in FIG. 3.

FIG. 6 is a sectional plan view similar to FIG. 4 showing displacement of the coupler and parts associated therewith to the full closure position and to the right with respect to the sill structure fixed to the car body.

FIG. 7 is a sectional plan view similar to FIG. 5 showing the movable sill structure displaced to the full closure position to the right relative to the fixed sill structure.

FIG. 8 is a transverse sectional view taken on the line 8—8 of FIG. 2.

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FIG. 9 is a transverse sectional view taken on the line 9—9 of FIG. 3.

FIG. 10 is a transverse section of the cylinder and associated portions of the sill structures and taken on the line 10—10 of FIG. 3.

FIG. 11 is a side elevation of the hydraulic mechanism in association with the sill structures which are shown in section and with the hydraulic mechanism in partly closed position to facilitate dismantling.

FIG. 12 is a similar view showing the manner in which the hydraulic mechanism is removed from the sill structures.

The invention pertains to hydraulic means in association with a railway car which acts to cushion impacts applied to the couplers in either direction. The arrangement of the hydraulic mechanism is such that it is operative to absorb the impact energy during the application of buffing or pulling impact forces applied to either of the couplers. The embodiment of the invention herein disclosed includes a hydraulic device which acts to cushion impacts in either direction and the entire mechanism is so designed that it is accommodated within a center sill structure fixed to the railway vehicle body.

Referring to the drawings there is represented in FIG. 1 a railway car body 16 which is equipped with a center sill structure 17 and which forms a part of the underframe of the railway car body 16. The center sill structure 17 is attached to the car body and forms the fixed sill structure. In carrying out the invention an auxiliary center sill structure 18 is arranged within the fixed sill structure so that the auxiliary sill structure may move longitudinally of the car body within and relative to the fixed sill structure 17. The slidable sill structure 18 consists of a pair of Z-shaped members joined along their length to form an inverted channel structure as shown in FIG. 10. The auxiliary sill structure 18 extends continuously throughout the length of the vehicle body and projects beyond each end of the fixed sill structure 17 as shown in FIG. 1. The auxiliary sill structure 18 extends beyond the ends of the fixed sill structure a predetermined distance in order to accommodate relative sliding movements of the sill structures during application of an impact force. The normal or neutral position of the auxiliary sill structure 18 as it projects beyond the ends of the railway car body 16 is shown in FIG. 1.

A striker casting 19 is provided at each end of the auxiliary sill structure 18 having a coupler carrier 21 thereon for supporting the stem of a railway coupler 22 of the knuckle type. The auxiliary sill structure carries front draft lugs 23 and rear draft lugs 24 which form portions of a unique casting as hereinafter described. Each coupler 22 is provided with a conventional type of draft rigging which includes a yoke 25 and a resilient draft gear as represented by phantom lines 26 and the usual front and rear followers 27 and 28. The coupler and the yoke and the draft gears are assembled and arranged in each end of the auxiliary sill structure 18 and cooperate in the usual manner with the coupler carrier 21 and the front draft lugs 23 and the rear draft lugs 24. Portions of the rear draft lugs 24 are joined by a transversely disposed element 29 which serves to limit the total relative movement of the auxiliary sill structure 18 relative to the fixed sill structure 17 as will be appreciated as the present disclosure proceeds.

The wheels of the truck for the vehicle body are represented in FIG. 1. A body center plate 31 is provided at the truck center which is secured to the fixed sill structure 17 as best illustrated in FIGS. 4 and 8. The center plate 31 includes lateral portions 32 which extend under the sill structure 17 and are attached to the outwardly disposed flanges of the fixed sill structures by means of

rivets 30. The center plate casting includes flanges 35 which extend beyond the lateral portions 32 and to which elements of the body bolster are attached by means of rivets 33. The body center plate 31 and its lateral portions 32 are reinforced by a pair of transversely extending ribs 34 which extend under the outturned flanges of the fixed sill structure 17. The body center plate is formed as a casting which includes an upstanding projection 36 having a hole therein for receiving the king pin. The center plate carries a lug 37 which is provided with a vertical outer face. The lug 37 is reinforced by two transversely spaced webs 38 having upper edges which slope downwardly in proceeding inwardly from the vertical face of the lug 37. The outer vertical face of the lug 37 forms a stop which cooperates with the transverse element 29 forming a part of the rear draft lugs 24 to limit relative movement of the sliding sill and fixed structures.

The rear draft lugs 24 and the transverse element 29 constitute a single casting. This casting is secured to the auxiliary sill structure 18 in any suitable manner such as by means of rivets 41 as best shown in FIGS. 2 and 8. Horizontally disposed ribs 40 join the rear draft lugs 24 and the transverse element 29. The casting is provided with extensions 42 which lie along the inner faces of the vertical webs of the auxiliary sill structure. Gusset webs 43 join the transverse member 29 with the extensions 42 to reinforce the casting. The extensions 42 are secured to the side webs of the auxiliary sill structure by means of rivets 41. The casting which includes the rear draft lugs 24 and the transverse element 29 together with the extensions 42 provides a structural assembly which has characteristics capable of handling the forces applied thereto during impacts which move the auxiliary sill structure relative to the fixed sill structure.

The casting making up the center plate 31 and the lug 37 includes a forwardly extending bottom plate 46 (FIGS. 2 and 4) which is secured to the outturned flanges of the fixed sill structure by means of rivets 47. This casting includes an inwardly extending bottom plate 48 which is secured to the outturned flanges of the fixed sill structure 17 in any suitable manner such as by rivets 49. A plate 50 is secured to the outwardly directed flanges of the auxiliary sill structure by means of rivets or the like as shown in FIGS. 2 and 4. This plate strengthens the auxiliary sill structure and supports the yoke 25. The center plate casting 31 and the appendants thereof provide a rigid structure for absorbing and handling the forces that are developed in supporting the load at one end of the vehicle body and for arresting movement of the auxiliary sill structure 18 with reference to the fixed sill structure 17 in limiting the stroke of the cushioning mechanism.

A hydraulic mechanism is positioned at the longitudinal central portion of the vehicle body. The structural characteristics of the hydraulic mechanism are best shown in FIGS. 3 and 5. The hydraulic mechanism includes a cylinder 51 and a piston 52 mounted for reciprocating movements in the bore of the cylinder. The cylinder 51 is accommodated within the auxiliary sill structure 18 as shown in FIG. 10. A piston rod 53 extends from the piston 52 and through a cylinder head 54. The cylinder head 54 is secured to the end of the cylinder 51. A cap member 56 is secured to the free end of the piston rod 53 by means of a bolt 57 or the like. A recoil spring 58 of a helical type surrounds the piston rod 53 and in the normal condition or neutral position of the parts is compressed a predetermined extent between the cap member 56 and the cylinder head 54.

A metering rod 59 is carried by the closed end wall of the cylinder 51 and extends along the axis of the cylinder. A cavity 61 is provided in the piston 52 which extends into a portion of the piston rod 53 for receiving the metering rod 59 during closure of the hydraulic device which occurs during longitudinal movement of the aux-

iliary sill structure 18 relative to the fixed sill structures 17. The bore of the cylinder 51 between the closed end wall and a floating piston 67 is completely filled with a suitable liquid. In the normal or neutral position of the mechanism a tip portion of the metering rod 59 extends into an orifice 62 in the piston which is aligned with the cavity 61. The orifice 62 in the piston controls the flow of liquid and the net effective orifice for the flow of liquid is the area between the circumference of the orifice 62 and the periphery of the metering rod 59. As the device closes the tapered metering rod 59 reduces the net area of the orifice in a manner calculated to produce the desired closure force of the mechanism.

The piston 52 is provided with a plurality of passages 64 and in the embodiment illustrated four such passages are provided. These passages are in communication with the cavity 61 adjacent the orifice 62. The total area of the four passages 64 is considerably greater than the area of the orifice 62 so that the liquid which flows through the orifice 62 with a certain velocity will also flow through the passages 64 without an increase in velocity. Accordingly the passages 64 do not act as orifices but merely as ducts to conduct the liquid from the vicinity of the orifice 62. Additional passages 66 are provided in the piston rod 53 in communication with the cavity 61 which act to relieve liquid from the cavity 61 for movement into bore portion of the cylinder without serving as restrictive orifices.

The floating piston 67 is provided in the cylinder 51 which in the normal position of the mechanism is in engagement with an annular shoulder 68 formed on the wall of the cylinder 51. A spring 69 arranged between the cylinder head 54 and the floating piston 67 urges the floating piston towards the shoulder 68. Any voids inside the cylinder between the floating piston 67 and the closed end surface 71 of the cylinder are completely filled with the liquid which is introduced through fill openings 72 (FIG. 3). These openings are closed by threaded plugs 73 one of which is shown in FIG. 10. Access to the fill openings 72 and the plugs 73 may be gained through apertures 74 formed in the floor structure of the railway vehicle body and through slots 75 in the auxiliary sill structure 18. Each of these apertures may be closed by a larger plug 76. Suitable means is provided for sealing the periphery of the piston 52 relative to the cylinder 51. Seals are also provided between the periphery of the floating piston 67 and the cylinder 51 and between the periphery of the piston rod 53 and the floating piston 67. Such sealing means desirably form liquid tight barriers but any liquid which may inadvertently pass beyond the floating piston will gravitate through a drain hole 60 shown in FIG. 3.

When the piston 52 moves toward the end wall surface 71 the floating piston 67 moves in an opposite direction to accommodate the liquid displaced by the piston rod 53 as it is introduced into the cylinder 51. The maximum travel of the floating piston 67 is such as to allow for movement of the piston 52 to a position adjacent the surface 71 and thereby enlarge the volume within the cylinder to accommodate liquid displaced by the piston rod 53 and any increase in volume of the liquid as a result of an increase of temperature of the liquid. As the piston 52 moves towards the surface 71 the spring 58 is compressed against the cylinder head 54 by the piston rod cap 56.

Upon the completion of an impact stroke the spring 58 recoils the piston 52 and the piston rod 53 to its normal or neutral position. The spring 69 urges the floating piston 67 to its inactive position in engagement with the annular shoulder 68. Such movement of the floating piston maintains the space between the floating piston 67 and the cylinder end surface 71 completely filled with liquid. The spring 58 is desirable of such capacity as to recoil the hydraulic mechanism and the auxiliary sill structure 18 to the neutral position.

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The closed end wall of the cylinder 51 is in abutting relationship with a pair of lugs 77 carried by the auxiliary sill structure 18. The cap member 56 is in abutting relationship with a pair of lugs 78 carried by the auxiliary sill structure 18. The lugs 77 include plate portions 79 which lie along the inner faces of the vertical webs of the auxiliary sill structure 18. The plate portions 79 are secured to the vertical webs of the auxiliary sill structure by means of rivets 81. Gusset ribs 82 further reinforce the lugs 77. The lugs 78 are similarly formed and the plate portions 79 thereof lie along the inner faces of the vertical webs of the auxiliary sill structure 18. Gusset ribs 82 reinforce the lugs 78. The plate portions 79 are secured to the auxiliary sill structure by means of rivets 81. The lugs 77 and 78 extend inwardly from opposite sides of the auxiliary sill structure 18 but the inner ends are spaced from each other to accommodate abutment members therebetween as hereinafter described.

The abutment members for the hydraulic mechanism are formed integral with a casting 80 which is of greater length than the hydraulic mechanism as shown in FIGS. 3 and 11. The abutment members are in the form of an upstanding projection 87 and 88. These upstanding projections are each of such dimensions measured transversely so as to avoid engagement with the lugs 77 and 78 during relative movements of the two sill structures. The casting 80 on which the upstanding projections 87 and 88 are formed includes side flanges 91 and 92 (FIG. 10) which are attached to the outturned flanges of the fixed sill structure 17 by means of a plurality of rivets 93. The casting 80 has an elongated central aperture 94 (FIG. 12) therein having an overall shape slightly greater than the horizontal dimensions of the hydraulic mechanism. The casting 80 under the abutment members or upstanding projections 87 and 88 is provided with integral and transversely disposed ribs 96 and 97. The upstanding projections 87 and 88 are further reinforced by means of parallel vertical flanges 102 (FIG. 5) with each pair of flanges joined by an inclined web 101.

The side flange 91 carries a depending web 103 and the side flange 92 carries a depending web 104 as best shown in FIG. 10. A plate 106 of such dimensions as to substantially close the aperture 94 is provided for supporting the hydraulic mechanism in the sill structures. The depending webs 103 and 104 are provided with elongated slots 107 and a plurality of keys 108 are arranged transversely under the plate 106 and these keys extend into the slots 107 carried by the depending ribs 103 and 104. The plate 106 has a flange along each side thereof which rests on the transversely extending keys 108 as shown in FIG. 10.

The hydraulic mechanism described in association with one end portion of the railway car body also functions to cushion impact forces applied to the coupler at the other end of the car body. Such an assembly prevents any end force being exerted on the body of the car except as metered through the hydraulic mechanism. The arrangement operates to control the magnitude of buffing forces and pulling forces applied to the conventional draft equipment at each end of the auxiliary sill structure 18. If an impact force is applied in the direction of the arrow 110 in FIG. 6 the auxiliary sill structure is shifted to the right relative to the fixed sill structure 17. The piston 52 is moved from the position shown in FIG. 5 to the position shown in FIG. 7 and there is a reduction of the volume within the cylinder 51 because of the presence of a greater portion of the piston rod 53 within the cylinder 51. The floating piston 67 is forced to the left from its position shown in FIG. 5 away from the annular shoulder 68. The floating piston serves to enlarge the volume of the cylinder 51 and to accommodate any increase in volume in the liquid as a consequence of an increase in the temperature of the liquid. The springs 58 and 69 are both compressed during such a stroke. The spring 58 serves to return the auxiliary sill structure 18

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to its neutral or normal position relative to the fixed sill structure 17 after the kinetic energy has been absorbed and the force of the impact stroke has been relieved. The spring 58 serves to return the auxiliary sill structure 18 inactive position towards the annular shoulder 68.

Any buffing impact applied to the coupler at the right end of the car body (FIG. 1) serves to move the auxiliary sill structure 18 to the left with respect to the fixed sill structure 17. During such a stroke the lugs 77 engage the closed end of the cylinder 51 and move the cylinder to the left from the position shown in FIG. 5. During such shifting of the cylinder the cap member 56 is in engagement with the abutment or upstanding projection 88 and the hydraulic mechanism then functions to absorb the energy of the impact force. Thus the mechanism functions to absorb impact energy during relative movement between the auxiliary sill structure 18 and the fixed sill structure 17 in either direction.

The orifice in the piston 52 and the metering rod 59 may be designed to produce as nearly as possible a rectangular force closure curve for substantially all car loads and at all speeds of approach producing an optimum condition of maximum energy absorption with minimum force and minimum closure. The structure disclosed in the present application provides the advantage that it can be metered to absorb the energy of collisions between cars of weights varying from an empty car up to a fully loaded car with protection of the car body from high impact forces. While conventional draft gears as employed in connection with the assembly assist the hydraulic mechanism in absorbing the energy of collisions such draft gears are not significantly helpful in connection with high velocity collisions because of the low capacity of the conventional type resilient draft gears.

The casting 80 which includes the upstanding projections 87 and 88 provides structure which facilitates the mounting of the hydraulic mechanism in association with the sill structures. The keys 108 are releasably retained in position by means of removable pins 112 (FIG. 10). The keys 108 may be withdrawn so that the plate 106 may be removed from a position underlying the hydraulic mechanism. A shoulder 114 is provided on the casting 80 at one end of the aperture 94. The shoulder 114 underlies the closed end wall of the cylinder 51 and a shoulder 116 on the casting 80 at the other end of the aperture 94 extends under a portion of the cap member 56 when the hydraulic device is in the inactive position shown in FIG. 3. When the plate 106 is removed the hydraulic mechanism is supported by the shoulders 114 and 116.

Another step in the removal of the hydraulic mechanism includes replacement of a key 108 in the position shown in FIG. 11. A supporting block 117 is arranged over the key 108 and under the cylinder 51. Force may then be applied to the auxiliary sill structure 18 in the direction of the arrow 118 (FIG. 11) whereby the lugs 78 engage the cap member 56 and the piston rod 53 is shifted to the right while the closed end wall of the cylinder 51 remains in abutting relationship with the upstanding projection 87. The overall length of the hydraulic mechanism is thus reduced as shown in FIG. 11. The cap member 56 is no longer supported by the shoulder 116 but the block 117 supports the hydraulic mechanism within the auxiliary sill structure.

A suitable linkage such as the chain 121 having hooks at the ends thereof is inserted in notches in the cap member 56 and in the cylinder head 54. Any suitable support as represented by the arrows 122 and 123 are then arranged under the ends of the hydraulic mechanism. The auxiliary sill structure 18 is then moved to the left from the position shown in FIG. 11. The hydraulic mechanism is then shifted slightly to the left so that the closed end wall of the cylinder 51 no longer overlies the shoulder 114. The central key 108 shown in FIG. 11 is then removed along with the temporary supporting block 117.

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The supporting devices as represented by the arrows 122 and 123 are lowered so that the hydraulic mechanism is removed from the sill structure through the aperture 94 in the casting 80. The hydraulic mechanism may be mounted in position in the sill structures by reversing the procedural steps described in connection with the removal of the hydraulic mechanism.

While the invention has been described with reference to a particular type of railway vehicle provided with one type of fixed center sill structure it will be appreciated that the invention is adaptable to other types of railway vehicles and in connection with other types of draft riggings and sill structures. Such modifications and others may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

What we claim and desire to secure by Letters Patent is:

1. In an underframe structure and cushion mechanism for a railway vehicle body, a center sill structure fixed to said vehicle body, an auxiliary sill structure extending throughout said center sill structure and movable longitudinally with respect thereto, a cushion mechanism within said sill structures, lugs carried by said auxiliary sill structure in abutting relationship with opposite ends of said cushion mechanism, an elongated member secured to said center sill structure in fixed relationship, said member being positioned below the level of said cushion mechanism and extending beyond the ends thereof, an upstanding projection integral with one end of said member in abutting relationship with one end of said cushion mechanism, another upstanding projection integral with the other end of said member in abutting relationship with the other end of said cushion mechanism, said member having an aperture therein with an area sufficient for said cushion mechanism to move therethrough, a plate filling said aperture, and means detachably engaging said member releasably retaining the plate in a position filling said aperture.

2. In an underframe structure and cushion mechanism for a railway vehicle body, a center sill structure fixed to said vehicle body, an auxiliary sill structure extending throughout said center sill structure and movable longitudinally with respect thereto, a cushion mechanism within said sill structures, lugs carried by said auxiliary sill structure in abutting relationship with opposite ends of said cushion mechanism, an elongated member secured to said center sill structure in fixed relationship, said member being positioned below the level of said cushion mechanism and extending beyond the ends thereof, an upstanding projection integral with one end of said member and having a substantially vertical face in abutting relationship with one end of said cushion mechanism, another upstanding projection integral with the other end of said member and having a substantially vertical face in abutting relationship with the other end of said cushion mechanism, said member having an aperture therein to accommodate said cushion mechanism, a plate filling said aperture, means detachably engaging said member releasably retaining said plate in a position filling said aperture, and a horizontal shoulder on said member adjacent the lower end of each of said vertical faces.

3. In an underframe structure and cushion mechanism for a railway vehicle body, a center sill structure fixed to said vehicle body, an auxiliary sill structure extending throughout said center sill structure and movable longitudinally with respect thereto, a cushion mechanism within said sill structures, lugs carried by said auxiliary sill structure in abutting relationship with opposite ends of said cushion mechanism, an elongated casting secured to said center sill structure in fixed relationship, said casting being positioned below the level of said cushion mechanism and extending beyond the ends thereof, an upstanding projection integral with one end of said casting in abutting relationship with one end

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of said cushion mechanism, another upstanding projection integral with the other end of said casting in abutting relationship with the other end of said cushion mechanism, an inclined web joining the upper end of each upstanding projection with the associated end of said casting, said casting having an aperture therein for accommodating said cushion mechanism, a plate filling said aperture, and means detachably engaging said casting releasably retaining the plate in a position filling said aperture.

4. In an underframe structure and cushion mechanism for a railway vehicle body, a center sill structure fixed to said vehicle body, an auxiliary sill structure extending throughout said center sill structure and movable longitudinally with respect thereto, a cushion mechanism within said sill structures, lugs carried by said auxiliary sill structure in abutting relationship with opposite ends of said cushion mechanism, an elongated casting secured to said center sill structure in fixed relationship, said casting being positioned below the level of said cushion mechanism and extending beyond the ends thereof, an upstanding projection integral with one end of said casting in abutting relationship with one end of said cushion mechanism, another upstanding projection integral with the other end of said casting in abutting relationship with the other end of said cushion mechanism, an inclined web joining the upper end of each upstanding projection with an associated end of said casting, said casting having an aperture therein to accommodate said cushion mechanism, a plate filling said aperture, means detachably engaging said casting releasably retaining the plate in a position filling said aperture, and transversely disposed beams reinforcing end portions of said casting in the vicinity of each upstanding projection.

5. In an underframe structure and cushion mechanism for a railway vehicle body, a center sill structure fixed to said vehicle body and having flanges along a lower portion thereof, an auxiliary sill structure extending throughout said center sill structure and movable longitudinally with respect thereto, a cushion mechanism within said sill structures, lugs carried by said auxiliary sill structure in abutting relationship with opposite ends of said cushion mechanism, an elongated casting below said hydraulic mechanism and extending beyond the ends thereof, a lateral flange integral with each side of said casting extending along the respective flanges on said center sill, means securing said lateral flanges in fixed relationship to the flanges on said center sill structure, an upstanding projection in abutting relationship with one end of said cushion mechanism, another upstanding projection in abutting relationship with the other end of said cushion mechanism, said casting having an aperture therein for accommodating said cushion mechanism, a plate for filling said opening, longitudinally extending webs depending from said lateral flanges at the sides of said aperture, and keys extending through slots in said webs releasably retaining the plate in position filling said opening.

6. In an underframe structure and cushion mechanism for a railway vehicle body, a center sill structure fixed to said vehicle body, an auxiliary sill structure extending throughout said center sill structure and movable longitudinally with respect thereto, a hydraulic mechanism within said sill structures and having means therein for metering movement of liquid, lugs carried by said auxiliary sill structure in abutting relationship with opposite ends of said hydraulic mechanism, an elongated casting below said hydraulic mechanism and extending beyond the ends thereof, a lateral flange integral with and extending along each side of said casting, means securing said lateral flanges in fixed relationship to said center sill structure, an upstanding projection having a substantially vertical face in abutting relationship with one end of said hydraulic mechanism, another upstanding projection having a substantially vertical face in abutting relationship

with the other end of said hydraulic mechanism, an inclined web joining the upper end of each upstanding projection with an associated end of said casting, said casting having an aperture therein for accommodating said hydraulic mechanism, a longitudinally extending web depending from each lateral flange along a side of said aperture, means reinforcing end portions of said casting adjacent the respective upstanding projections, a plate closing said aperture, and means detachably engaging said webs retaining said plate in position closing said opening.

7. In an underframe structure and cushion mechanism for a railway vehicle body, a center sill structure fixed to said vehicle body, an auxiliary sill structure extending lengthwise throughout said center sill structure and movable longitudinally with respect thereto, a hydraulic mechanism within said auxiliary sill structure which includes a cylinder and a piston and a piston rod carried by the piston extending through a first end of the cylinder, said piston having an orifice therein and a metering rod carried by the second end of said cylinder adapted to enter said orifice, a floating piston within said cylinder surrounding said piston rod, liquid filling the cylinder between the second end and the floating piston, lugs carried by said auxiliary sill structure in abutting relationship with the piston rod and the second end of the cylinder, a member secured to said fixed sill structure underlying said hydraulic mechanism and extending beyond ends thereof, an upstanding projection rigid with each end of said member in abutting relationship with the piston rod and the second end of the cylinder, an annular shoulder within said cylinder limiting movement of the floating piston towards the second end of the cylinder, and a spring within the cylinder urging the floating piston towards said annular shoulder.

8. In an underframe structure for a railway vehicle body, a center sill structure fixed to said vehicle body, an auxiliary sill structure extending lengthwise within said center sill structure and movable longitudinally with respect thereto, a coupler and a draft rigging at an end of said auxiliary sill structure, a hydraulic mechanism within said auxiliary sill structure having means therein for

metering the movement of liquid, lugs carried by said auxiliary sill structure in abutting relationship with ends of said hydraulic mechanism, a projection carried by the center sill structure at one end of said hydraulic mechanism in abutting relationship therewith, another projection carried by the center sill structure at the other end of said hydraulic mechanism in abutting relationship therewith, front and rear draft lugs in operative association with said draft rigging, said rear draft lugs including plate portions which lie along and secured respectively to vertical portions of said auxiliary sill structure, a transverse element joining said plate portions, a center plate secured to said center sill structure including a bottom plate underlying said plate portions and secured to the center sill structure, an upstanding lug on said center plate having a face in abutting relationship with said transverse element, and vertically disposed longitudinally extending webs joining said center plate with said upstanding lug.

9. A center plate structure for the underframe of a railway vehicle comprising, a body center plate, laterally extending portions carried by said center plate, an upstanding lug carried by said center plate having a substantially vertical abutment face, spaced webs connecting said upstanding lug with said center plate, and an upstanding projection disposed between said webs having a vertically disposed pin receiving hole therein.

10. A rear draft lug structure for the underframe of a railway vehicle comprising, a pair of draft lugs having aligned abutment faces, an extension projecting from each draft lug, a transverse element joining said extensions and spaced from said abutment faces, ribs joining said transverse element with said draft lugs, and webs joining said transverse element with said extensions beyond said transverse element.

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