This invention relates to a railroad car draft gear and more particularly to a means to incorporate a hydraulic draft gear in a pocket formerly containing another type of draft gear.

In the conventional draft gear, it has been the practice to use friction devices in combination with conservative energy cushioning devices; i.e. rubber grommets, springs, etc. These have not always proven satisfactory for one reason or another such as short stroke and low efficiency of the unit, and therefore, it is an object to provide an energy dissipative cushioning device in operative connection with the coupler of a railroad car.

It is also an object of this invention to utilize an existing railroad car structure which accommodates the mounting of an energy dissipating device to said car.

Another object is to provide a railroad car with an energy dissipative device with a minimum of rework.

Still another object of this invention is to increase the permissible stroke of a draft gear unit of a railroad car.

Yet another object of the invention is to provide a railroad car with a hydraulic cushioning and damping mechanism of such arrangement with respect to a railroad coupler as to greatly reduce the likelihood of transmission of injurious shock to the car upon sudden impact forces being supplied to the coupler.

FIGURE 1 is an isometric view of a draft gear of the prior art having the center sill cut away along its longitudinal center line in order to show a prior art draft gear in location;

FIGURE 2 is a sectional plan view of a draft gear according to the present invention for installation on existing railroad car sills;

FIGURES 3 and 3A are isometric views showing, respectively, a support according to the present invention and the support mounting a coupler to an existing center sill.

FIGURE 4 is a side sectional view of a sill structure incorporating an energy dissipating device according to the present invention;

FIGURE 5 is a schematic sectional view of another embodiment incorporating an energy absorbing device within a railroad car sill according to the present invention;

FIGURE 6 is a side sectional view of the draft gear arrangement shown schematically in FIGURE 5 for mounting railroad draft gears according to the present invention;

FIGURE 7 is a sectional view taken along line 7-7 of FIGURE 6;

FIGURE 8 is a sectional view taken along line 8-8 of FIGURE 6.

Referring now to FIGURE 1, a draft gear arrangement of the prior art type is depicted having a center sill 19 which forms a part of the underframe for a railroad car. The center sill is provided with a striker face member 12 which limits the travel of the draw bar 14 in the buff direction.

The draw bar 14 is operatively connected with a yoke 18, as by a key 20, which yoke 18 surrounds a cushioning mechanism 22. The cushioning mechanism 22 is positioned between stops of a center filler 24, one of which is shown, which form compressive stops engageable with end plate 26 and follower plate 28 associated with the cushioning means 22.

I have found that a method of increasing the cushioning capacity of railroad draft gear is to incorporate a long stroke hydraulic shock absorber slotting into the existing center sill 10. In doing so, and in order to provide additional stroke, I have found that it may be necessary to increase the length of a coupler 34. This, however, necessitates a supporting structure 35, as shown in FIGURE 3, which can support and mount the longer coupler to the center sill as well as replace yoke 18 in transmitting draft forces to the center sill 10 in such a manner as to permit a longer buff travel of the coupler and draw bar on the order of eight or more inches as compared to the 2¾" stroke of the prior art draft gears.

In more detail, the supporting structure 35 comprises four plates 40, 42, 44 and 46. The plates 40 and 46 are slotted, as at 48 and 50, whereas the plates 42 and 44 are perforated, as at 52 and 54. In addition, plates 40 and 46 are perforated, as at 56 and 58, respectively.

In order to mount the coupler to the center sill 10, the coupler 34 is slotted, as at 60 and 62, and the center sill is modified by addition of slots 66 in the downwardly depending sides thereof. As may also be seen, the draft key slots 64 and the draft gear stops of the center sill 10 have been unaffected by this arrangement, but, as the center sill 10 has been slotted, as at 66, it may be necessary to reinforce the slots by plates 31 to maintain the designed sill strength. In addition, the striker face member 12, as in prior art devices, is slotted, as at 70, which slot 70 is in alignment with slot 64 of the center sill.

As may also be seen from FIGURES 3 and 4, the hydraulic shock absorber 39 is of a common type having an end fitting 72 slotted as at 73 and a slidable portion 74. The end fitting 72, as seen in FIGURES 2 and 4, is placed in abutting relationship with the center filler 24. The slidable portion 74 is normally positioned to have a forward face 78 abutting a plate 80, which plate 80 engages the rearward portions of the striker face member 12. In addition, the end fitting 72 of the shock absorber receives a key 82 through slot 73, which key 82 also passes through slots 59, 54 and 66 to form the rear mount for the shock absorber 39 and the support network 30; whereas keys 84 and 86 form forward mounts for said support network as well as provide pivotal and vertical support for the coupler 34.

Thus, it may be readily appreciated that I have enabled the fitting of an existing sill structure of a railroad car with a long stroke hydraulic energy dissipative device without any reworking of the sill itself except the cutting of slots 66 and adding of reinforcements 31. Instead, I have added a novel support and reinforcing network to the sill structure, which support network also operatively connects a coupler with a cushioning mechanism of the type described.

In operation an impact load delivered to the coupler such as in a buff direction, translates the coupler to compress the shock absorber or energy dissipative device, as it may be termed. The coupler 34 is, however, slotted, as at 62, such that the translation is limited by the abutment of the key 84 with the forward portion of said slot 62 at which time key 84 has also translated to abut with the rear face of slots 64 and 70. If desired, travel of the coupler could be limited by bottoming of the hydraulic unit prior to abutment of the key 82 with the rear face of slots 64 and 70. In a draft operation, the travel of the coupler is limited by abutment of keys 82 and 84 with the forward portions of slots 66 and 64, respectively.

I have found that an existing sill structure may also be modified to incorporate a long travel hydraulic energy dissipative device by a sliding sill adapted to be translatable within the existing sill. In more detail, and with
reference to FIGURES 6, 7, and 8, the draw bar 14 is mounted to the sliding sill 92 by the standard draft key 26, which key extends through slots 96 and 98 in the fixed center sill 16, which slots have been opened forwardly, and the sliding sill 92, respectively. As seen in FIGURE 6, the draw bar 14 abuts the forward face 102 of an energy dissipating device, which energy dissipating device has its rear face 104 abutting a center filler 106 attached to the sill 10 of a railroad car, which center filler is of a special design. The center filler 106 being added to an existing center sill in place of the more familiar center fillers, said center filler 106 being provided with a recess 105 to accommodate the end or rear face 104 of the shock absorber.

The forward member of the energy absorbing device is affixed to the sliding sill 92 and the car sill 10 by keys 108, which keys, as may be better seen in FIGURE 5, pass through slots 110 and 112 in the sliding sill 92 and the car sill 10, respectively, as well as through grooves 113 in forward face 102 of the shock absorber. The keys are held in place by lock pins 114 mated with holes 116 of said pins, as by any appropriate means such as threading, press fit, etc.

In order that a cushioning unit, according to the above description, may slide in an existing sill structure, bronze or similarly constructed bearings 118 (see FIGURES 6 and 7) are provided along the sides of the sliding sill 92. These bearings also reduce the frictional forces between the sill 10 and the sill 92 due to the properties of the metal or composition forming said bearings.

In addition, the sliding sill 92 is joined with the rear portion of the energy absorption device as at 120 whereby draft forces compress the energy dissipation device as well as buffer forces. Due to the need for maintaining the sill structure strength a pair of plates 122 are welded to each side of sill 19, as seen in FIGURE 8, to replace the sill structure removed in cutting slots 112.

As for the operation of a device utilizing the sliding sill arrangement of FIGURES 6, 7, and 8, it can best be explained with reference to the schematic of FIGURE 5 where buff loads on coupler 34 compress the forward end of the shock absorber towards the rearward portion of same until the hydraulic unit bottoms prior to keys 26 and 108 abutting the rear faces of slots 110, 112 and 96, 98, respectively. In draft the limits of travel are provided by the rear portions of slots 110 abutting key 108, which draft movement of coupler 88 moves the rear member of the shock absorber towards the front member due to the draft force of the sliding sill 92 with said rear member as at 120.

It will be apparent that I have provided advantageous constructions for fitting existing railroad cars with a long stroke energy dissipative device, and capable of carrying the loads such mechanism might impose, and that the constructions as illustratively disclosed are readily adapted to various underframe structures of railway cars.

1. In a railroad car draft gear, a center sill for the railroad car having a center filler, an energy dissipative cushioning device, a coupler and draw bar assembly slideable in said center sill, means for mounting said cushioning device in the center sill, said mounting means comprising a slidable structure including a plurality of rigid members extending along the center sill in a longitudinally parallel relationship thereto, means connecting said coupler and draw bar assembly with said slidable structure for limited sliding movement relative to each other in buff, means connecting the rear ends of said members to the center sill slidably and to said cushioning device for actuating the cushioning device in draft, one end of said cushioning device being in abutting relationship with said center filler and the other end of said cushioning device being in abutting relationship with the coupler and draw bar assembly.

2. A means to incorporate a draft gear into center sill in accordance with claim 1 wherein said mounting means includes at least one transverse key extending through said cushioning device and said center sill, said key providing a travel stop in either direction for said cushioning device.

3. A means to incorporate a draft gear into a center sill in accordance with claim 1 wherein said coupler and draw bar assembly is mounted by at least one transverse key to said center sill, said key operatively engaging a slot in said center sill to limit buff travel of said coupler and draw bar assembly.

4. In a railroad draft gear, a coupler:
   a. a center sill structure attachable to the underside of the railroad car into the open end of which the coupler extends, said center sill including a striking face member at its open end and a center filler member longitudinally spaced from said open end;
   b. a support network of plates parallel to the longitudinal axis of said center sill;
   c. a cushioning device located within said center sill;
   d. a plurality of transverse keys uniting said coupler, said support network and said cushioning device with said center sill such that said cushioning device is held between said striking face and said center filler of said center sill structure.

5. In a railroad car draft gear, a center sill extending throughout the length of the railroad car, said center sill having spaced slots;
   a. a coupler provided with spaced slots;
   b. a support network surrounding said center sill, said support network including a plurality of slotted plates;
   c. an energy dissipative device slotted at one end and a plurality of transverse keys passing through said slots of said center sill, said coupler, said support network and said energy dissipative device to operatively unite said center sill with said coupler, said support network and said energy dissipative device.

6. In a railroad car draft gear, a center sill extending throughout the length of the railroad car, said center sill having spaced slots in the sides thereof;
   a. a sliding sill within said center sill and spaced from said center sill by bearing members, said sliding sill having spaced slots in the sides thereof coextensive with the slots in said center sill;
   b. a coupler mounted to said sliding sill and said center sill by a first pin means, which first pin means is operatively associated with one of said slots in said sliding sill and said center sill;
   c. an energy dissipative device connected with said sliding sill at the end of said sliding sill opposite that which receives the coupler, said energy dissipative device being grooved at its forward end, which groove is coextensive with a pair of said slots in said sliding sill and said center sill;
   d. a second pin means extending through said pair of slots in said sliding sill and said center sill and resting in said groove of said energy dissipating device, said second pin means in cooperation with said slots of said sliding sill and said center sill forming buff limit stops for said draft gear.

7. In a railroad car draft gear, a center sill extending throughout the length of the railroad car, said center sill having spaced slots in the sides thereof; a sliding sill within said center sill and spaced from said center sill by bearing members, said sliding sill having spaced slots in the sides thereof coextensive with the slots in said center sill; a coupler provided to the forward end of said sliding sill and said center sill by a first pin means, which first pin means extends through pairs of said slots in said sliding sill and said center sill; a hydraulic cushioning device connected with said sliding sill...
at the rear end thereof, and second pin means extending through slots in said sliding sill and said center sill and being fixedly connected to the forward end of said cushioning device, said second pin means in cooperation with said slots of said sliding sill and said center sill forming buff limit stops for said draft gear.

8. A railroad car draft gear according to claim 1 wherein said rigid members of slidable structure include a first pair of vertical plates outside said center sill and parallel thereto, and a second pair of vertical parallel plates each located between one of said first plates and said center sill, said connecting means including pin means extending through said first and second pairs of plates.

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