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3,164,262

LONG STROKE DRAFT GEAR WITH FULL DRAFT HYDRAULIC ACTION

Filed April 23, 1962

2 Sheets-Sheet 1

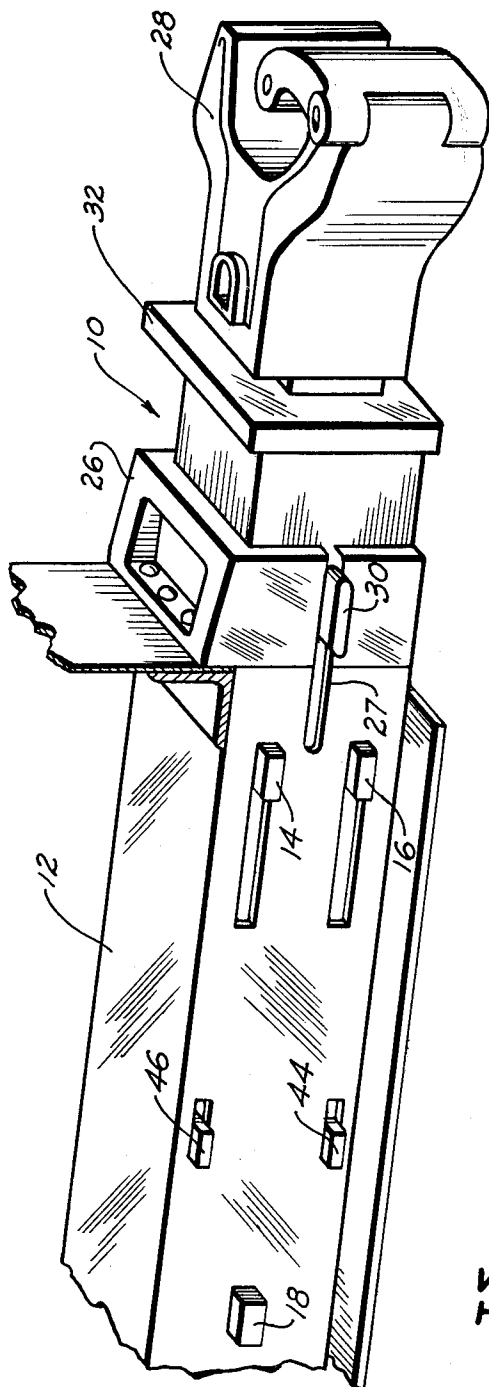


FIG. 1

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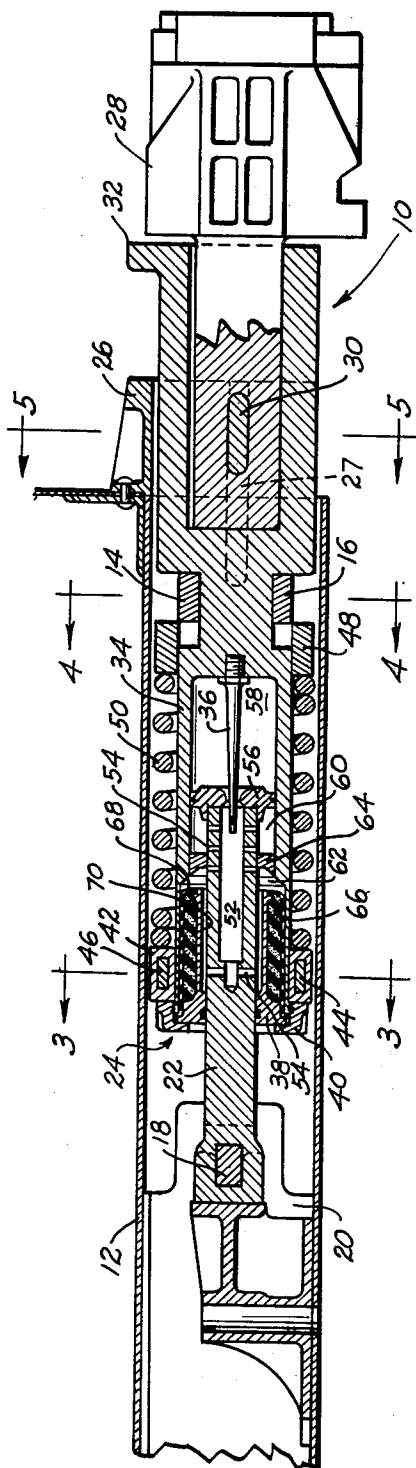


FIG. 2

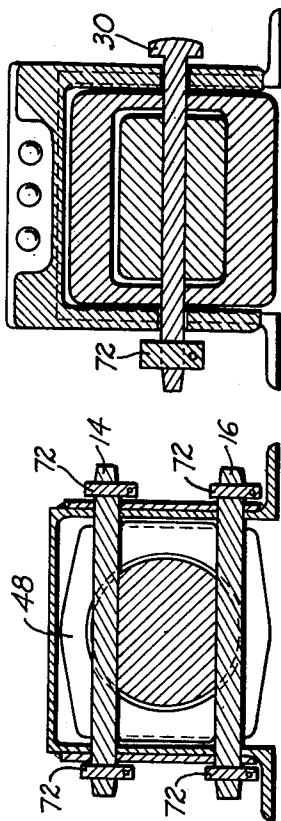


FIG. 4

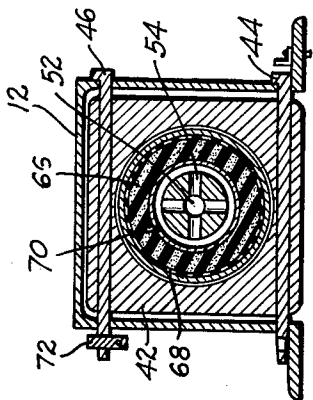


FIG. 5

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LONG STROKE DRAFT GEAR WITH FULL DRAFT HYDRAULIC ACTION

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This invention relates to a railroad car draft gear and more particularly to a means for relating a hydraulic cushioning mechanism with a slidable and a fixed member such that movement of the slidable member in the buff or draft direction will effect a dissipation of energy within the cushioning mechanism.

In a conventional draft gear, it has been the practice to use cushioning or friction springs for withstanding forces such as impact applied to a coupler. It has also been attempted by more modern day draft gear designers to construct a hydraulic draft gear and interrelate same with a railroad car to afford the desired energy dissipation therefor. However, such practices have not afforded full draft cushioning unless a cushioning arrangement is in the normal, non-active position.

It is therefore the intent of this invention to provide a hydraulic draft gear cushioning mechanism which may resist draft action in any position that the cushioning mechanisms may be.

It is also the object of this invention to provide a sliding member within the open end of a fixed center sill of a railroad car.

It is yet another object to modify an existing center sill structure to incorporate a sliding member which is designed to form a part of the cushioning device.

Still another object of this invention is to provide a center sill modified by the insertion through the open end thereof of a sliding member which is capable of mounting a standard coupler and unite said coupler with a cushioning mechanism in a novel way so that all movements of said coupler effect operation of the cushioning device.

Other objects and features of this invention will more fully appear from the following detailed description taken in connection with the accompanying drawings which illustrate a single embodiment thereof and in which:

FIGURE 1 is an isometric view of my invention applied to a center sill;

FIGURE 2 is a vertical sectional view of a draft gear of FIGURE 1 in accordance with the features of this invention;

FIGURE 3 is a sectional view along lines 3-3 of FIGURE 1;

FIGURE 4 is a sectional view along lines 4-4 of FIGURE 1; and

FIGURE 5 is a sectional view along lines 5-5 of FIGURE 1.

In accordance with the features of this invention there is provided a railroad draft gear 10 mounted within a housing consisting of an existing railroad car center sill 12 which is modified by the incorporation of slots in the downwardly depending sides thereof to accommodate transverse keys 14, 16, 18, 44 and 46. The center sill is also modified by the insertion of a center filler 20 designed in accordance with the present invention to accommodate a tubular member 22 of the shock absorber 24, which tubular portion is held within the modified center filler 20 by the key 18 that also extends through the slots in the side of the center sill 12. The standard striker face 26 is incorporated with the center sill 12 as is a standard coupler 28. However, the familiar draft key slot 27 in the sill 12 and striker 26 has been lengthened and in fact may be opened out depending upon the length of draft stroke desired.

The coupler 28 is mounted to the center sill 12 by a familiar draft key 30, which draft key also holds the coupler to a slidable member 32 which is to be placed within the confines of center sill 12. The slidable member 32 has a rearward portion which is formed as a cylinder 34 that mounts a metering pin 36 at one end thereof, and at the opposite end thereof is closed by an end cap 38 that is adapted to slide along the tubular member 22. A collar 40 is suitably secured to the end cap 38, and collar 40 bears upon another collar 42 which allows cylinder 34 to slide leftwardly and which is slotted to receive transverse pins 44 and 46 which extend through the center sill 12, as may be seen in FIGURE 3. A still further collar 48 is provided about the cylinder 34 which is in abutting relationship with the transverse keys 14 and 16. Between the collars 42 and 48 is placed a spring 50 which opposes motion in either direction.

The tubular member 22 is bored as at 52 and is provided with a plurality of radial passages 54, and a wall serving as a piston 56 is affixed to the open end of the bore 52, which piston has a central orifice receiving metering pin 36 and is adapted to translate within the cylinder 34 and thereby divide the cylinder into two variable volume chambers 58 and 60. A third chamber 62 of fixed volume is formed within the cylinder 34 by a guide member 64 that is associated with the cylinder in such a manner as to allow the tubular member 22 to slide there-through. Within the third fixed volume chamber 62 a compressible substance such as neoprene sponge rubber member 66 is provided which is incased in an impervious membrane 68 and held in a spaced relation about the tubular member 22 by a sleeve 70 integrally associated with the end cap 38.

It is to be understood that all of the transverse keys are locked in position, such as by the schematic pins 72 shown in FIGURES 2, 3, and 4.

In operation a buff force upon coupler 28 causes leftward motion of the cylinder 34, as viewed in FIGURE 1, which decreases the volume of chamber 58 causing the fluid therein to flow about pin 36 into bore 52 and to pass through the radial passages into chambers 60 and 62. The fluid entering the chamber 62 compresses the compressible member 66 by impinging on the impervious membrane 68. If a draft force is experienced while the cylinder 34 is in a normal or a leftward position it will be absorbed by the rightward motion of the cylinder causing the fluid within chamber 60 to be ported through the radial passages 54 which are progressively closed by the partition or guide member 64 until only the extreme right passage ports the fluid from the variable volume chamber 60. During draft, cylinder 34 can move rightwardly until it abuts the left side of keys 14 and 16, FIG. 2, and keys 44 and 46 can move rightwardly in their slots in the center sill. Draft forces are transmitted from cylinder 34 to the center sill by spring 50, and through member 22 and key 18 by hydraulic pressure on piston 56.

As those skilled in the art may manufacture devices other than those shown and described above, we do not intend to be limited by such description but rather by the appended claims.

We claim:

1. In a railroad car, a draft gear comprising:
 - a coupler;
 - a center sill forming a housing for the draft gear attachable to the underside of said car;
 - a slidable member mounted in one end of said center sill and having hollowed portions at both ends, which member receives said coupler in one of said hollow portions;
 - a means attaching said coupler to said center sill and said member, said means allowing longitudinal

- movement of said coupler and said member relative to said center sill;
- a center filter structure mounted within said center sill;
- a tubular member mounted to said center filler and to said center sill, which tubular member extends into the other of said hollowed portions at the end opposite that portion which receives said coupler and hydraulic means in said members to dissipate energy applied to said slidable member through said coupler.
2. A hydraulic draft gear comprising:
- a center sill;
- a translatable member including a hollow cylinder and a hollowed portion at opposite ends thereof;
- a coupler;
- a first means mounting said coupler to said member within the hollowed portion thereof, said first means also mounting said member in one end of said center sill;
- a second means also mounting said member to said center sill;
- a tubular means mounted to said center sill, which tubular means extends within said cylinder of said member, said tubular means having radial passages in the walls thereof leading from a bore therewithin;
- an end cap for said hollow cylinder, which end cap forms a sliding seal for said tubular means within said cylinder;
- a wall mounted to said tubular means within said cylinder, which wall divides said cylinder into first and second variable volume chambers, said wall having an orifice therethrough adapted to communicate said variable volume chambers through the bore and radial passageways of the tubular member; and
- a resilient return means between said member and said center sill to restore said member to its normal position after the loads displacing same have been removed.
3. A hydraulic draft gear according to claim 2 and further comprising a compressible cellular material in said second variable volume chamber which receives fluid from said first variable volume chamber upon buff loads being applied to said coupler.
4. A hydraulic draft gear in accordance with claim 2 and further comprising a guide member affixed to said translatable member in said second variable volume chamber, said guide member being in sealing contact with said tubular means behind said wall whereupon said second chamber is sub-divided into two portions, one of which is of fixed volume and the other is of variable volume, said guide member being positioned to control the number of radial passageways communicating the bore of said tubular member to each chamber portion.
5. A hydraulic draft gear in accordance with claim 4 wherein a compressible structure is mounted within said fixed volume chamber portion behind said guide member, which fixed volume chamber portion receives fluid from said variable volume chambers upon buff forces being applied to said coupler.
6. A hydraulic draft gear comprising:
- a housing;
- a member translatable mounted within said housing; which member includes a hollow cylinder and a hollowed portion at opposite ends thereof with said hollow cylinder having a partition means fixed thereto;
- a coupler;
- a first means mounting said coupler to said member within the hollowed portion thereof;
- a tubular means mounted to said housing, which tubular means extends within said cylinder of said member, said tubular means having a central bore and radial passages leading therefrom;
- an end cap for said hollow cylinder, which end cap

- forms a sliding seal for said tubular means within said cylinder, said end cap being provided with an annular structure that extends within said cylinder;
- a compressible substance mounted about said annular structure of said end cap within said cylinder behind the partition means thereof;
- a wall mounted to said tubular means within said cylinder which wall divides said cylinder into a first and a second variable volume chamber ahead of said partition means, said wall having an orifice therethrough which communicates said variable volume chambers and the space behind said partition through the bore and radial passages of said tubular means;
- a metering pin mounted to said member and extending through the orifice in said wall to vary the area thereof upon buff loads being applied to said coupler; and
- a resilient return means between said member and said housing to restore said member to its normal position after the loads displacing same have been removed.
7. In a railroad car having a coupler and a center sill, a long travel hydraulic draft gear providing hydraulic resistance to draft forces in any position of buff deflection, said draft gear comprising a cylinder means and piston means in said cylinder means movable relative to each other and providing two variable volume fluid chambers within said cylinder means, one of said means being fixed to the center sill, a member in the outer end of the center sill fixedly connecting the other of said means to the coupler, means for mounting said member for limited sliding movement in the center sill in buff and draft directions, and resilient means for returning said piston means and cylinder means to predetermined relative positions after buff and draft movements thereof.
8. A draft gear according to claim 7, wherein said piston means includes a tubular portion extending into said cylinder means, a wall having a central orifice fixed to the inner end of said tubular portion, a metering pin mounted on said cylinder means and extending into said orifice, an end cap on said cylinder means providing a sliding fluid seal between said cylinder means and said piston means, said tubular portion having a plurality of axially spaced openings near its inner end, and an annular partition fixed to said cylinder means and surrounding said tubular portion for forcing fluid through said openings during a draft impact.
9. In a railroad car having a coupler and a center sill having a plurality of pairs of opposed slots in opposite vertical sides of the center sill, a long travel hydraulic draft gear providing hydraulic resistance to draft forces in any position of buff deflection, said draft gear comprising a cylinder and piston means in said cylinder movable relative to each other and providing two variable volume fluid chambers within said cylinder, said piston means being fixed to the center sill, a member fixed to said cylinder and slidably mounted in the outer end of the center sill, means fixedly connecting said cylinder to the coupler, a plurality of keys engaging said member and cylinder and each extending through a pair of the opposed slots for mounting said member and cylinder for limited sliding movement in the center sill in buff and draft directions, and resilient means disposed between a pair of said keys for returning said piston and cylinder means to predetermined relative positions after buff and draft movements thereof.

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