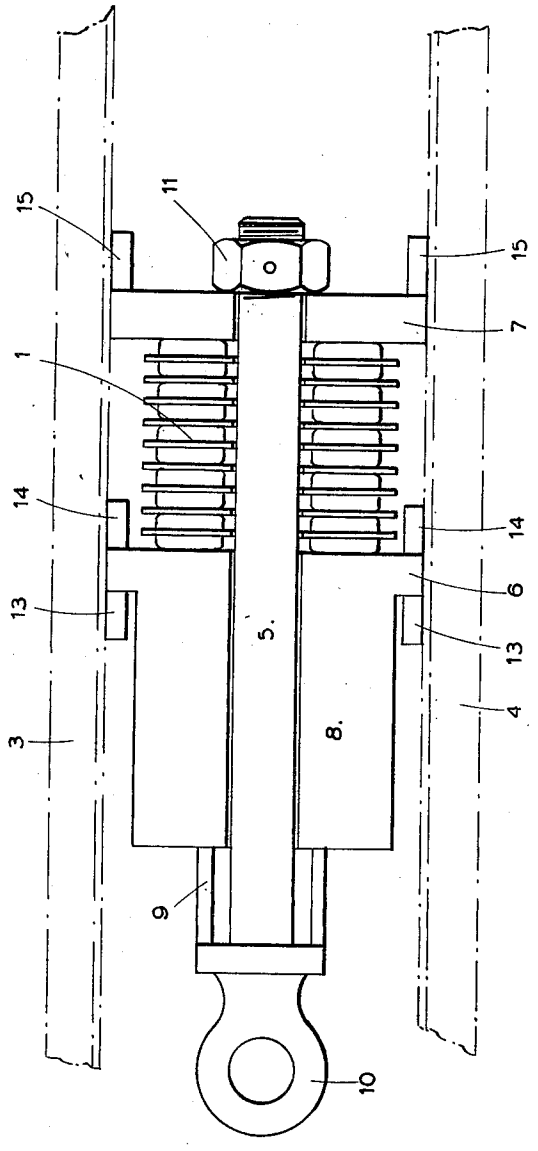
April 24, 1962 J. C. SPENCER ET AL 3,031,089

CENTRAL BUFFING AND DRAFT GEAR

Filed March 5, 1959

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FIG. 1.



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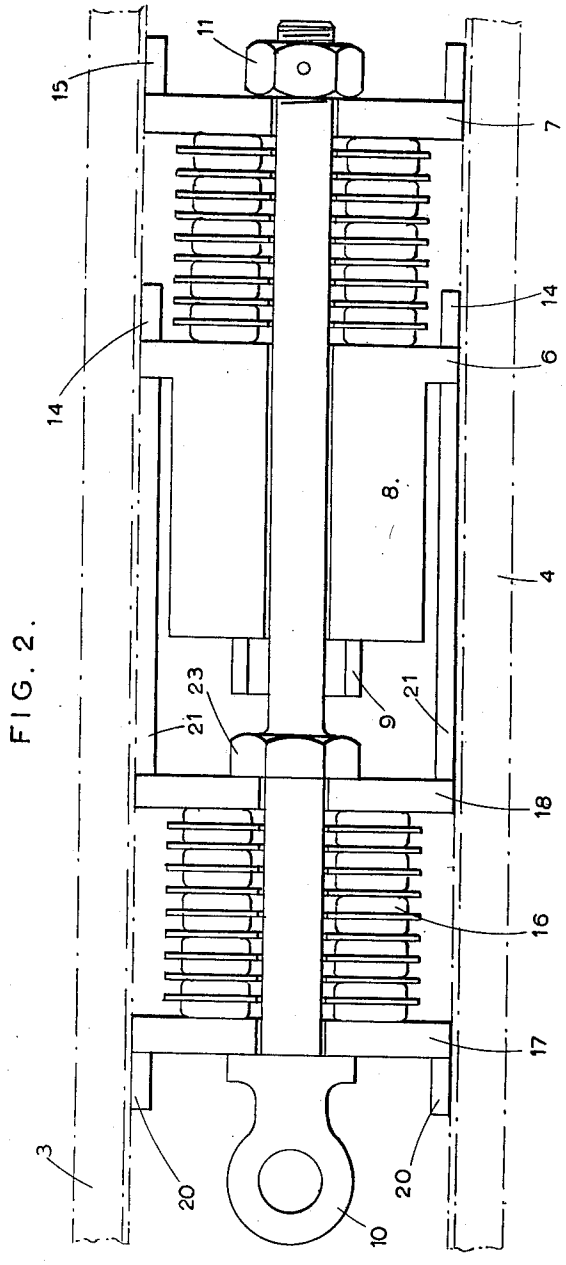


FIG. 2.

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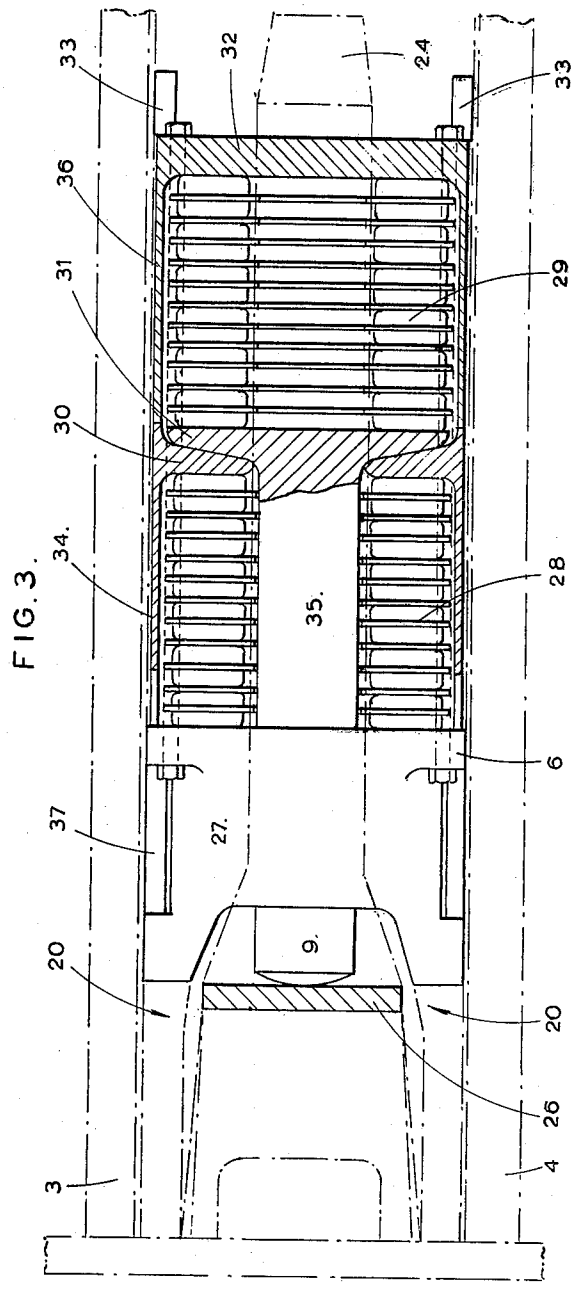


FIG. 3.

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CENTRAL BUFFING AND DRAFT GEAR

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FIG. 4.

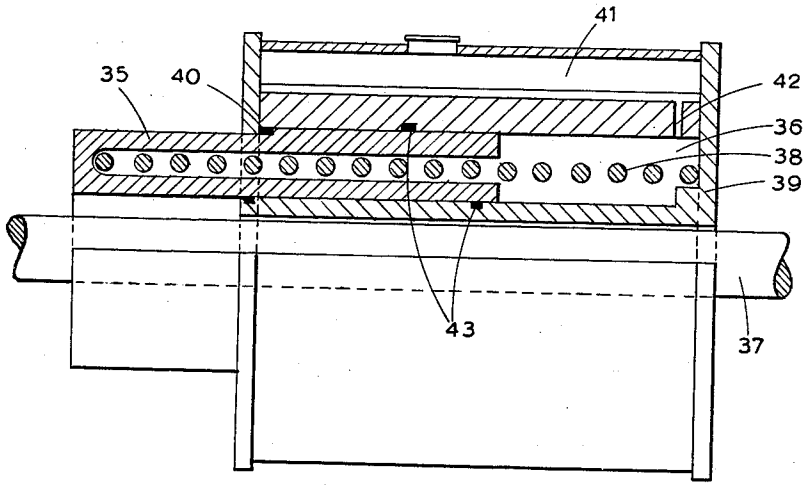
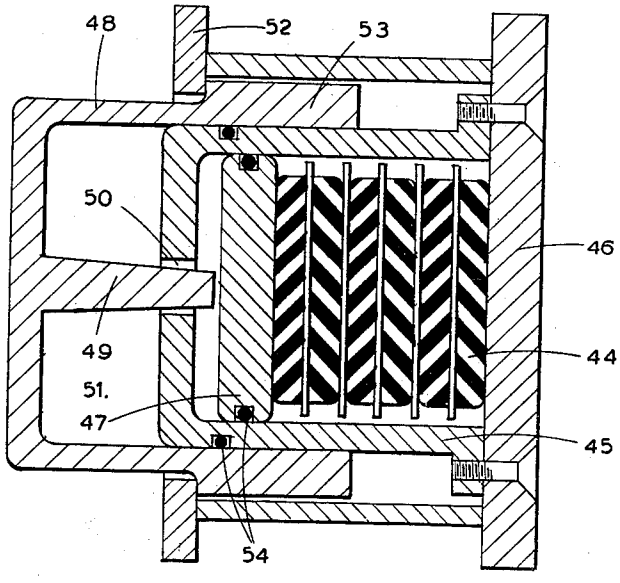


FIG. 5.



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CENTRAL BUFFING AND DRAFT GEAR

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2 Claims. (Cl. 213—43)

This invention relates to central buffing and draft gear for railway vehicles, more especially of the kind comprising a hydraulic or oleo unit and a resilient e.g. rubber spring arrangement situated between the centre sills so as to cushion both buffing and draft shocks.

The invention has for its object to provide improved constructions of gear in which the hydraulic buffer cushions the main buffing thrusts whilst the resilient or rubber spring arrangement operates on draft and, it may be, also on buffing.

The principle of the hydraulic buffer is to dissipate energy but it is incapable of functioning under a sustained load and although capable of affording movement under sudden pressure as a buffer or sudden snatch recoils in draft, it is useless under the collar load of a tractive effort. It is therefore impossible to design a type of hydraulic buffer which is capable of functioning in draw with the effectiveness it does in buffing. Accordingly it is an object of the present invention to provide the resilience in traction of steel, rubber or other resilient springs combined with the controlled cushioning in buff effected by hydraulic means.

Central buffing and draw gear according to the present invention includes steel, rubber or other resilient springs located between the centre sills of the vehicle and having front and rear followers the front follower of the resilient spring acting as the rear follower or base plate for the hydraulic or oleo unit or oleo pneumatic buffing system or vice versa.

Preferably the resilient springs act on draft only and comprise a column of units each consisting of suitably circular metal plates with bars or concentric rings of rubber projecting at their faces, separating plates suitably of metal being interposed between the successive units of the column.

The front follower of the spring units and base plate of the hydraulic or oleo casing or spring may be operatively connected to the coupler shank through the medium of a central draw rod passing axially through the oleo and springs or the combined buffing and draft gear may be embraced by a yoke on the front whereof the coupler shank is pivoted.

Where a central draw rod is provided the hydraulic unit comprises a circular hollow piston designed to move longitudinally in an annular hydraulic system encircling the draw rod: a helical steel spring is contained in the cylinder, one end of which is seated at the foremost end of the piston, the opposite end being seated on the rear follower or base plate of the oleo casing. Encircling the cylinder on the outside and connected to it by orifices is an otherwise sealed chamber for the reception of the hydraulic medium during the buffing operation.

The followers can be placed to co-operate with fixed abutments on the centre sills or alternatively the casing of the hydraulic or oleo buffer can be formed so that it abuts against the fixed abutment on the centre sills thus forming an abutment for the rubber draft springs.

Three embodiments of buffing and draft gear according to the invention and suitable hydraulic units will now be described with reference to the accompanying diagrammatic drawings in which:

FIG. 1 shows in plan centrally mounted buffing and draft gear comprising a single hydraulic unit in series with a column of rubber springs operated by means of a central draw rod and wherein the hydraulic unit operates solely on buff and the rubber springs solely on draw.

FIG. 2 shows in plan a similar system but possessing an additional column of rubber springs between the buckeye and the hydraulic unit and acting both on buff and draw.

FIG. 3 shows in plan a yoke embraced system where two columns of rubber springs in tandem operate on draw, and a single hydraulic unit on buff.

FIGS. 4 and 5 show two embodiments of hydraulic unit suited respectively to systems operated on the one hand by a central draw rod and on the other by a yoke.

Referring now to the drawings but first more specifically to the arrangement shown in FIG. 1 a column of annular concentric rubber spring units 1 is located between the centre sills 3 and 4 of a vehicle, and surrounding a central draw rod 5. The column of spring units 1 has front and rear followers 6 and 7 the front follower 6 for the column forming the rear follower for an annular hydraulic unit 8 which also surrounds the central draw rod 5. This rod 5 is flanged at its front outer end to abut with a piston 9 of the hydraulic unit 8 and integral with the flanged portion is buckeye 10 for a drawbar coupler shank. At the inner end of the rod 5 a nut 11 provides an abutment for the rear follower 7 when the system operates on draw.

The follower 6 is retained between fixed stops or abutments 13 and 14 on the sills 3 and 4 to prevent longitudinal movement of the hydraulic unit 8 during buffing and draft operation, the rearmost follower 7 being retained on fixed abutments 15 only in buff. This arrangement therefore provides a single hydraulic unit operating solely during buffing operations and a column of springs operating solely on draw.

In FIG. 2 an additional column of rubber spring units 16 is interposed between front and rear followers 17 and 18 and is located between the buckeye 10 and the hydraulic unit 8. Abutments 20, 21 for the followers 17 and 18 are arranged to permit the column of spring units 16 to operate both on buff and on draw, and for this purpose a nut 23 on the central draw rod abuts with follower 18 to compress the springs 16 on draw, likewise compressing the piston 9 of the hydraulic unit 8 on buff.

This arrangement could, if desired, be used in a yoke. FIG. 3 shows combined hydraulic buffer and rubber draft gear incorporated in a vertical yoke 24 which is adapted to be operatively connected to the coupler shank (not shown). An appropriate abutment 26 in rear of the coupler shank to operate the piston 9 of the hydraulic unit 27 when the coupler shank moves rearwardly on buff.

20 are again front fixed abutments on the centre sills 3 and 4.

In rear of the hydraulic unit 27 the yoke 24 houses two columns of rubber spring units 28 and 29 arranged tandem-wise with a rear follower 30 for the front column, a front follower 31 for the rear column and a rear follower 32 for the column last mentioned. 33 are fixed rear stops on the centre sills 3 and 4 for the rear follower 32, the stops being positioned to apply initial compression to the two columns of rubber spring units and to enable the rubber springs to cushion draft shocks.

The rear follower 30 of the front column is formed with a forwardly extending sleeve 34 and the stroke of the rubber springs when cushioning draft shocks is determined by the front end of this sleeve 34 coming into abutment with the rear wall of the hydraulic unit 27.

To enable the two columns of springs to function in parallel and thus to aggregate their capacity, the front

follower 31 of the rear column is provided with a stool 35 extending forwardly through the front column to the hydraulic unit 27 and the rear follower 32 of the column 29 is formed with a sleeve 36 extending forwardly into abutment with the rear follower 30 of the front column 28.

The hydraulic unit operates exclusively on buff and to this end is provided with auxiliary fixed stops 37 on the centre sills to prevent its rearward movement when the abutment 26 moves rearwardly and operates the piston 9.

FIGS. 4 and 5 show two embodiments of hydraulic unit adapted for use in buffing and draft gear according to the invention. In FIG. 4, where a central draw rod is provided, the hydraulic unit comprises a circular hollow piston 35 designed to move longitudinally in an annular cylinder 36 encircling the draw rod 37 and a helical steel spring 38, one end of which is seated at the foremost end of the piston 35, the opposite end being seated on the base plate 39 of the unit to return the piston to its outermost position when released after buffing. A limit stop 40 retains the piston in this position. Encircling the cylinder 36 on the outside is a chamber 41 directly connected to the cylinder through bleed orifices 42 for the reception of the hydraulic medium during the buffing operation. Rubber or plastic rings 43 ensure fluid-tight sealing between the piston and cylinder.

The buffing arrangement shown in FIG. 5 which is especially suited for use in yoke embraced buffing and draft gear, combines into one system the effectiveness of both hydraulic and rubber spring methods of shock absorption.

A column of rubber springs 44 within a hollow, circular chamber 45 abut at one end with the follower or base plate 46 of the unit, and at the other end with a follower 47 slidable within the chamber 45. This chamber is surrounded for its greater part by a circular cylinder 48 having an inwardly projecting tapered rod 49 which passes horizontally through an annular space 50 in the wall of the chamber to act as a progressive restriction for the hydraulic fluid contained in the space 51 in cylinder 48; thus, during the buffing stroke a restricted flow of liquid passes into the chamber 43 where simultaneous compression of the column of springs 44 has increased the volumetric capacity within the chamber. A limit stop 52 retains the flanged portion 53 of the cylinder 48 in its extended position and rubber or plastic rings 54 ensure fluid-tight sealing.

The term hydraulic buffer is intended to comprehend any unit which operates either by hydraulic or combination of hydraulic and pneumatic with or without additional springs either of steel or rubber to augment the pressure, and hydraulic buffer with recoil by pneumatic, steel or rubber springs.

What we claim is:

1. In a vehicle having a draft member for connection to a vehicle in tandem relation thereto, at least one longitudinally compressible resilient member mounted fixedly at one end on the first mentioned vehicle, a longitudinally compressible fluid shock absorbing member anchored at one end on said first vehicle in axially aligned relationship with said resilient member, said fluid shock absorbing member comprises an annular cylinder, an annular piston reciprocably mounted in said cylinder, means for limiting the outward movement of the piston and spring means engaging the piston and urging the piston to such outward position, said draft member engaging both said resilient member and said fluid shock absorbing member, means on said draft member for compressing said resilient member in response to longitudinal movement of the draft member in one direction and means on said draft member for compressing said fluid shock absorbing member upon longitudinal movement of the draft member and said resilient member in the opposite direction.

2. In a vehicle having a draft member for connection to a vehicle in tandem relation thereto, at least one longitudinally compressible resilient member mounted fixedly at one end on the first mentioned vehicle, a longitudinally compressible fluid shock absorbing member anchored at one end on said first vehicle in axially aligned relationship with said resilient member, said fluid shock absorbing member comprises an annular cylinder, a piston mounted within said cylinder, said piston having a chamber formed therein and including a variable aperture part communicating with said chamber and said cylinder and means to decrease the aperture of the part as buffing proceeds, said draft member including a yoke encircling both said resilient member and said fluid shock absorbing member, means on said draft member for compressing said resilient member in response to longitudinal movement of the draft member in one direction and means on said draft member for compressing said fluid shock absorbing member and said resilient member upon longitudinal movement of the draft member in the opposite direction.

References Cited in the file of this patent

UNITED STATES PATENTS

739,912	Otis	Sept. 29, 1903
877,943	Nash	Feb. 4, 1908
911,874	Haseltine	Feb. 9, 1909
1,877,399	Hewitt	Sept. 13, 1932
2,186,267	Page	Jan. 9, 1940
2,686,667	Willison et al.	Aug. 17, 1954
2,713,485	Tillou	July 19, 1955
2,816,670	Edwards et al.	Dec. 17, 1957
2,944,681	Blake	July 12, 1960