

April 9, 1935.

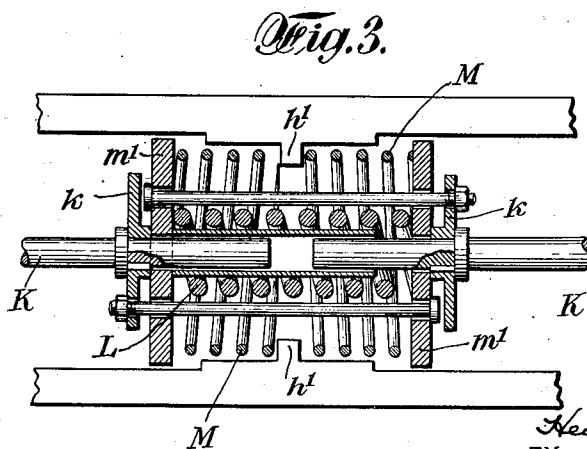
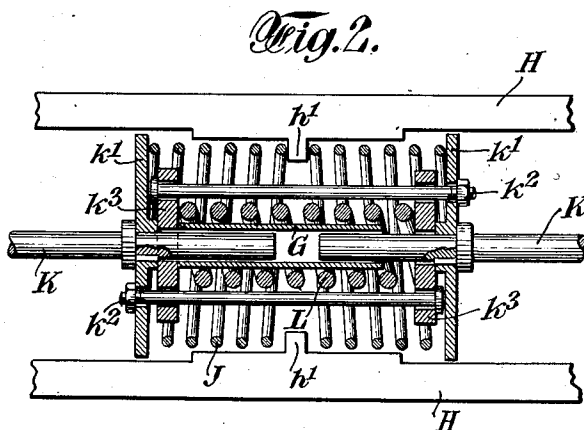
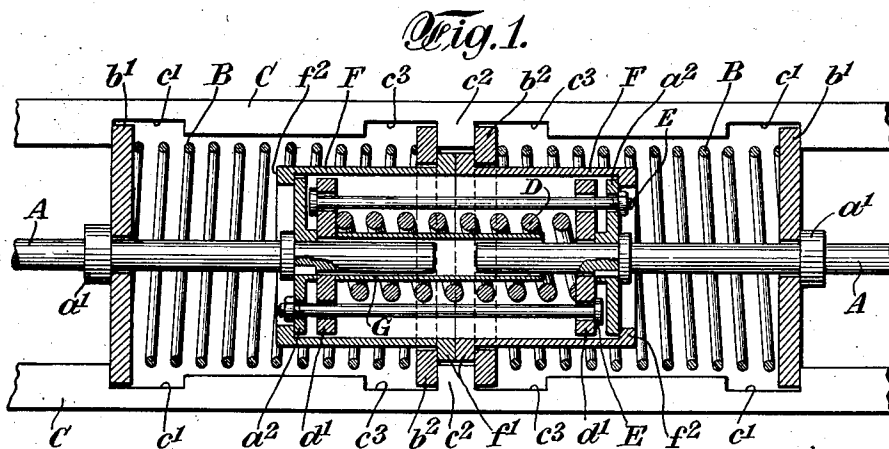
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1,997,170

DRAFT GEAR FOR RAILWAY VEHICLES

Filed Dec. 13, 1932

4 Sheets-Sheet 1



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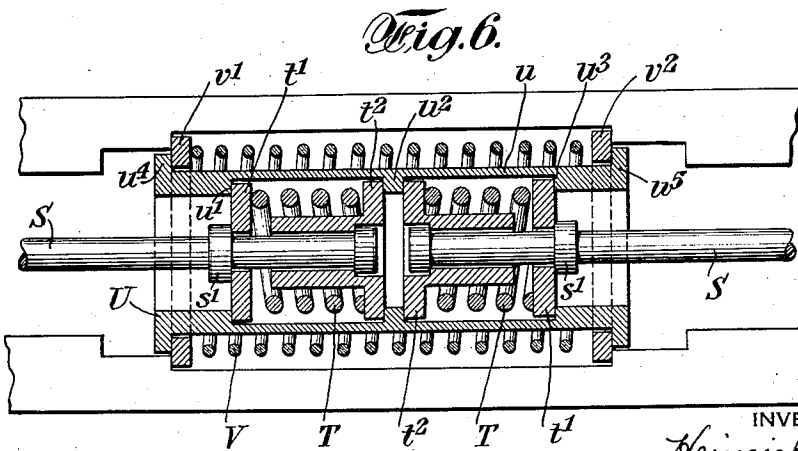
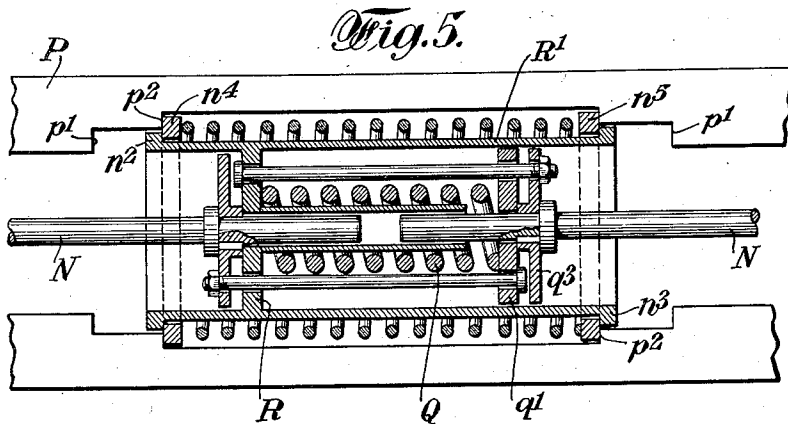
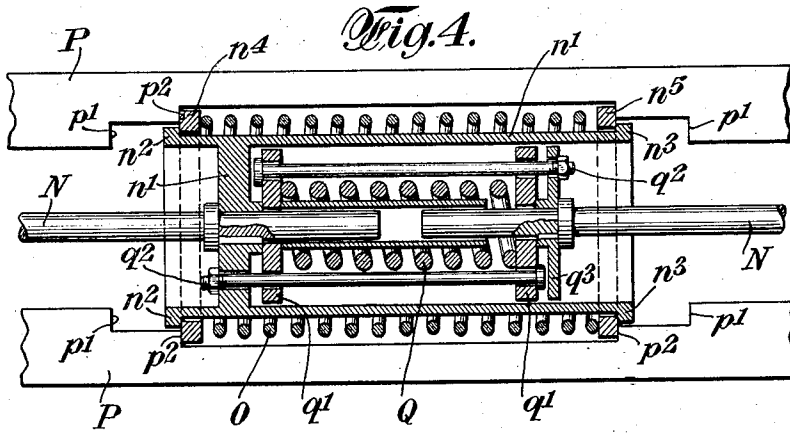
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DRAFT GEAR FOR RAILWAY VEHICLES

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4 Sheets-Sheet 2



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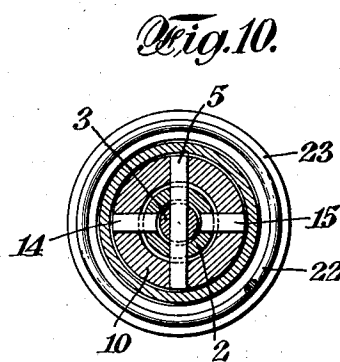
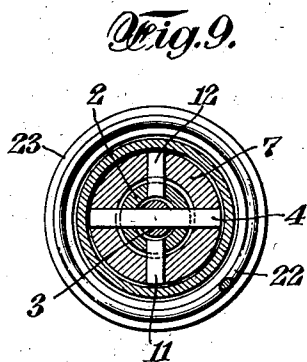
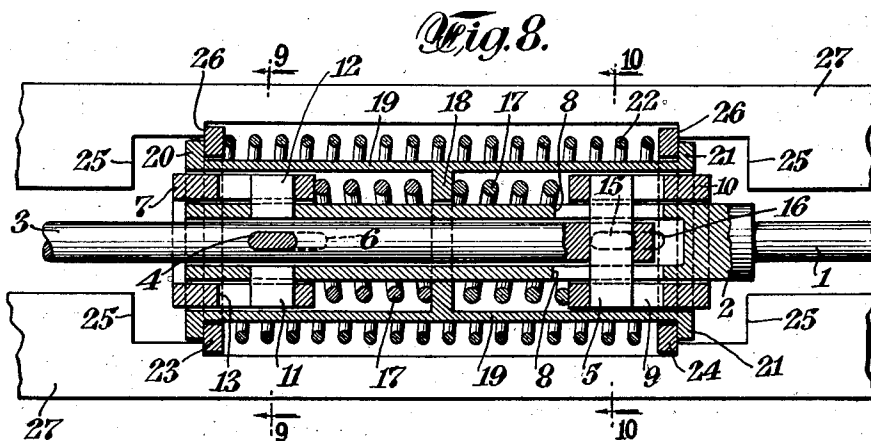
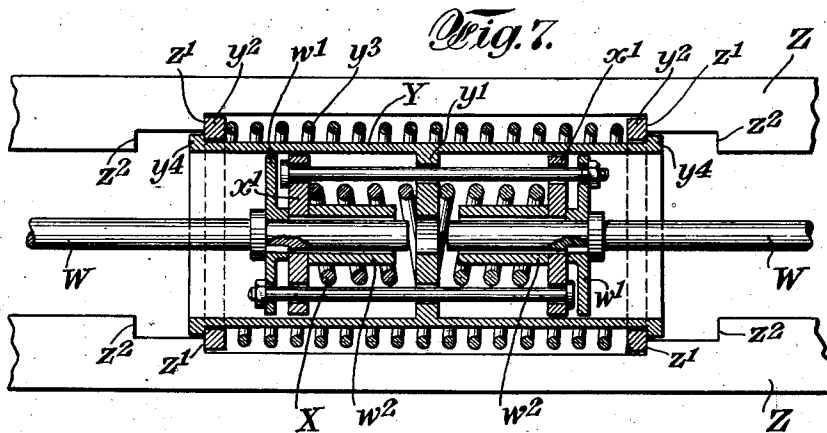
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DRAFT GEAR FOR RAILWAY VEHICLES

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4 Sheets-Sheet 3



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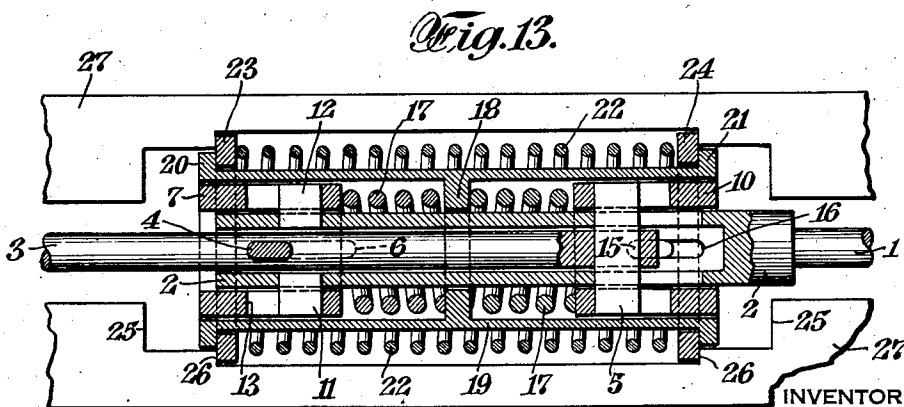
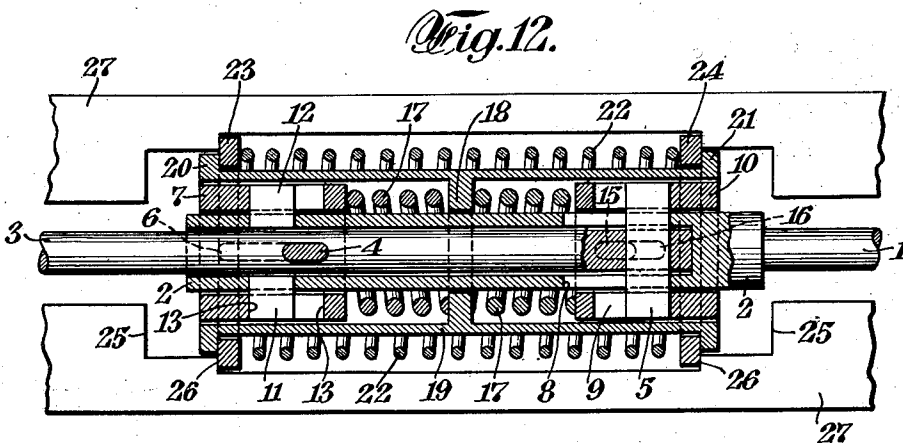
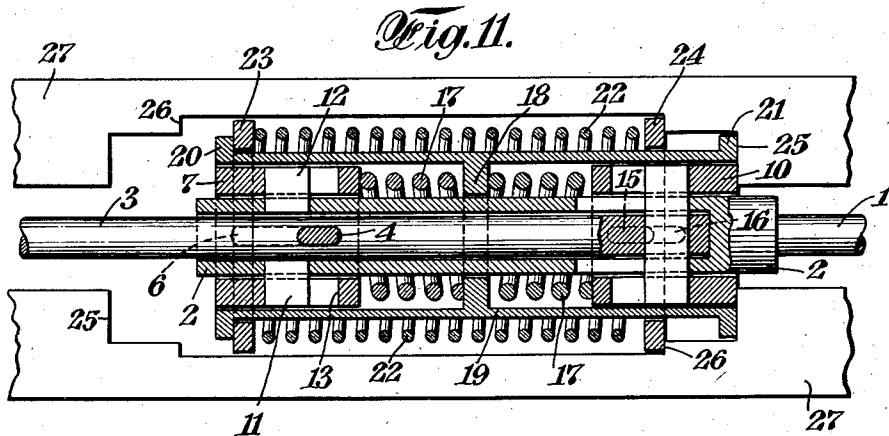
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DRAFT GEAR FOR RAILWAY VEHICLES

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4 Sheets-Sheet 4



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DRAFT GEAR FOR RAILWAY VEHICLES

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This invention relates to elastic draft gear for railway vehicles. Such draft gear commonly consists of a pair of draft or buffing rods arranged in tandem and extending substantially the length of the car or vehicle with a lost motion connection between the inner ends of the rods, spring means being provided to oppose relative movement of the rods and additional spring means being provided for transmitting stresses from each rod to the vehicle body.

An object of this invention is a compact arrangement of the various spring means, thereby making the elastic draft gear more adaptable to short cars than heretofore.

According to the present invention, the lost motion connection between the two rods and the spring means opposing relative movement of the two rods are arranged within the confines of the spring means for transmitting stresses from the draft gear to the vehicle body, the entire assembly being arranged centrally of the vehicle body. This arrangement of frame and rod springs reduces the space requirements of the same and makes the draft gear adaptable for short cars.

Other objects, novel features and advantages of this invention will be apparent from the following specification and accompanying drawings, wherein:

Figs. 1 to 8 inclusive are axial sections through different embodiments of the invention;

Figs. 9 and 10 are sections on the lines 9—9 and 10—10 of Fig. 8 respectively, and

Figs. 11 to 13 are views similar to Fig. 8, but with the elements in different positions.

Referring now more especially to Fig. 1, the draft and buffer rods A are provided with collars a' against which are pressed spring plates b' by helical springs B. Longitudinal frame bars C of the vehicle are formed with recesses c' into which extend the spring plates b' . The springs B also bear against spring plates b^2 left between recesses c^3 formed in the frame members C and into which extend the spring plates b^2 . A follower a^2 is rigidly connected to each rod A and a helical spring D arranged coaxially of the rods A presses against each follower a^2 a spring plate d' slidably mounted on the corresponding rod A. Each of the followers a^2 is connected with the opposite spring plate d' through two rods E parallel to the rods A and disposed diagonally with respect to each other, each of the rods E passing freely through the remaining plate d' . The followers a^2 are surrounded by a two-part sleeve F having abutments f' against which bear the spring plates b^2 and having abutments f^2 which are engaged by the

followers a^2 . A tube G receives the inner ends of the rods A and serves to limit compression of the spring D.

When both rods A are simultaneously subjected to inward push, the two followers a^2 and plates d' are moved toward each other, thereby compressing the spring D and such movement may continue until further compression of the spring D is prevented by the tube G. The rods E move freely through the followers a^2 and the plates d' and the spring D is effective only to transmit strains from one rod to the other. The collars a' move the spring plates b' toward each other, thereby compressing the springs B and as the springs are opposed to each other, no accelerating forces will be applied to the vehicle with equal strokes of the rods A.

When draft stresses are applied simultaneously to the rods A, each follower a^2 carries along by means of the rods E, the opposite spring plate d' so that again the spring D is compressed, but transmits no force to the vehicle. Simultaneously, the portions of the sleeve F are moved outwardly by the followers a^2 so that each spring plate b^2 compresses the corresponding spring B, but no accelerating force is transmitted to the vehicle structure upon equal strokes of the rods A.

The application of inward push to the right rod A causes compression of the corresponding spring B by means of the spring plate b' . If the left rod A offers no resistance, it will be displaced to the left by force transmitted through the right follower a^2 , right spring plate d' , spring D, left spring plate d' and a left follower a^2 , without any appreciable compression of the spring D. The left follower a^2 then transmits force through the left portion of the sleeve F by means of the abutments f^2 and f' to the left spring plate b^2 which, in turn, compresses the left spring B. Forces are thereby transmitted from the draft gear through the two springs B to the vehicle and accelerate the same.

Outward pull exerted on the right rod A causes the right follower a^2 to move to the right and carry with it the right half of the sleeve F so that the right spring B is compressed and tends to accelerate the vehicle. At the same time, the movement of the right rod A is transmitted to the left rod A through the linkage consisting of right follower a^2 , rods E, left spring plate d' , spring D, right spring plate d' , rods E and left follower a^2 and the left rod A through the medium of the left spring plate b' , compresses the corresponding spring B and also tends to accelerate the vehicle.

In the embodiment shown in Fig. 2, springs J

are disposed between the longitudinal frame members H of the vehicle and bear at one end against the followers k' next to the rods K and at the other end against abutments h' on the frame members H. The followers k' operate in a similar manner to the first embodiment through the medium of rods k^2 and spring plates k^3 on a spring L disposed around the inner ends of the rods K. A tube G receives the inner ends of the rods K and is effective to limit compression of the spring L.

If both rods K are simultaneously subjected to inward push, they will compress the spring L and the two springs J through the medium of the followers k' and the spring plates k^3 . When the rods K are simultaneously subjected to outward pull, then as in the case of the first embodiment, the spring L will also be compressed while the springs J will be free from load. In both cases, no accelerating force is transmitted to the vehicle. In the case of inward push on one rod only, the corresponding follower k' will compress the adjacent spring J, while the remaining rod K will be displaced through the linkage between the two rods K, the remaining spring J being unaffected. In the case of a pull on one rod K, the action will be just reversed.

In the embodiment disclosed in Fig. 3, springs M bear against abutments h' and against spring plates m' which in turn engage followers k mounted on the draft rods. Rods k^2 connect each follower k with the opposite spring plate m' and pass freely through the remaining spring plate. With this arrangement, simultaneous pulls or pushes on the draft rods result in compression of the springs M as well as the spring L.

In the embodiment shown in Fig. 4, the draft and buffer rods N are connected through the medium of a tube n' having end flanges n^2 and n^3 . Two spring plates n^4 and n^5 are movably mounted on the tube n' and a helical spring O is interposed between these plates. The longitudinal frame members P are provided with abutments p' for engagement with flanges n^2 and n^3 and with abutments p^2 for engagement by the spring plates n^4 and n^5 . A spring O surrounds the inner ends of the rods N and is interposed between spring plates q' slidably mounted on the rods N, these spring plates being connected with the tube n' and a follower q^3 by rods q^2 , the tube N' and the follower q^3 being rigid respectively with the left and right rods N.

If the two rods N are simultaneously subjected to inward push, the followers will carry along the spring plates q' thereby compressing the spring Q. In such movement, the tube n' will be moved to the left so that its flange n^2 will carry along the spring plate n^4 , thereby compressing the spring O. In the case of simultaneous pull on both rods N, the movement of each of these rods will be transferred through the rods q^2 to the spring plate q' of the other rods N so that the spring Q will again be compressed. Also, the tube N' will be moved to the left, thereby causing compression of the spring O through corresponding movement of the flange n^3 .

An inward push on the left rod N causes the flange n^2 of the follower N' to compress the spring O through the medium of the plate n^4 while the spring Q remains unaffected.

In the case of inward push on the right rod N, this rod through its followers and the spring plates q' will first remove the spring Q and also the right rod N to the left, the flange n^3 carrying along the plate n^5 and compressing the spring O.

In the case of an outward pull on the left rod N, movement of the rod will be transmitted through the tube N' and the flange n^3 thereof to the plate n^5 , thereby compressing the spring O. Upon outward pull on the right hand rod N, the tube n' is moved through the linkage comprising rods q^2 , left spring plate q' , spring O, right spring plate q^1 , rods q^2 so that its end flange n^2 cooperates with the spring plate n^4 to compress the spring O.

The embodiment shown in Fig. 5 differs from that shown in Fig. 4 only by the fact that the tube R' corresponding to the tube N' of Fig. 4 forms a single piece with a spring plate R arranged on the left draft rod N. The operation of the springs of this embodiment is substantially the same as previously described.

In the embodiment shown in Fig. 6, each of the two draft and buffer rods S are provided with two collars S' and S^2 , each pair of which serve as abutments for a pair of spring plates t' and t^2 arranged on the inner ends of the rods S. Between each pair of plates t' and t^2 there is arranged a helical spring T which maintains the plates t' and t^2 in contact with the collars s' and s^2 and with abutments u' , u^2 and u^3 of a tube U which surrounds the inner ends of the rods S. The tube U is provided with end flanges u^4 and u^5 which serve as abutments for spring plates v' and v^2 between which is arranged a helical spring V surrounding the tube U.

Upon inward push on both rods S, the spring plates t^1 will compress the springs T against the spring plates t^2 , but no load is applied to the springs V. Upon outward pull on both rods S, the plates t^2 will compress the springs T against the plates t^1 without loading the spring V. Upon outward pull or inward push on only one of the rods S, the tube U will be moved in one or the other direction under the action of one of the springs T and accelerating force will be transmitted from the tube U to the vehicle body through the spring V.

The embodiment shown in Fig. 7 has two draft and buffer rods W to which followers w' are rigidly connected. On the ends of the rods W there are mounted tubes w^2 which are surrounded by a strong helical spring X. The springs X bear at one end against spring plates X' slidably mounted on the rods W and at the other end against the intermediate wall y' of a tube Y on which are arranged two spring plates y^2 with a helical spring y^3 interposed between said spring plates. Each of the followers w' is connected through draft rods w^3 with the spring plate x' of the other rod w . Upon simultaneous inward push on both rods W, the springs X will be compressed through the medium of their spring plates x' . Upon outward pull on both rods W, each follower w' exerts pull on the spring plate x' of the other rod W through the draft rods w^3 so that the springs X are compressed. In either case, no load is applied to the spring y^3 . Upon an inward push on one rod W only, the pushed rod carries along one of the spring plates y^2 through the linkage comprising spring plate x' , spring X and intermediate wall y' , tube Y, flange y^4 , thereby compressing the spring y^3 and thus transmitting force resiliently from the draft gear to the vehicle. Upon pull on one rod only, compression of the spring y^3 is effected through the linkage comprising collars y' , draft rods w^3 , spring plate x^1 , spring X, intermediate wall y^1 , tube Y and flange y^4 .

In the embodiment shown in Figs. 8 to 13, one

end of the draft and buffer rod 1 is in the form of a tubular sleeve 2 in which is movably mounted the second draft and buffer rod 3. The rod 3 is provided with two rigidly connected arms 4 and 5, arranged at right angles to each other. The arm 4 is guided in two opposed longitudinal apertures 6 of the sleeve 2 and extends into longitudinal apertures of a tubular abutment member 7, slidably supported on the sleeve 2. The arm 5 is also guided in two longitudinal apertures of the sleeve 2 and extends into longitudinal apertures 9 of an abutment member 10 slidably mounted on the sleeve 2. Two additional arms 11 and 12 are secured to the sleeve 2 at right angles to the arm 4 and extend into longitudinal slots 13 in the abutment member 7. Also, arms 14 and 15 are rigidly secured to the sleeve 2 at right angles to the arm 5 and extend into longitudinal slots 16 of the abutment member 10. Against each of the abutment members 7 and 10 bears the end of the helical spring 17, the other end of which bears against a rib 18 in the tube 19. The tube 19 is provided at both ends with flanges 20 and 21 against which spring plates 23 and 24 are pressed by a helical spring 22 surrounding the tube 19. The frame members 27 of the vehicle are provided with abutments 25 to be engaged by the flanges 20 and 21 and by the abutment members 7 and 10 and also are provided with abutments 26 to be engaged by the spring plates 23 and 24.

If the rod 3 is pushed inwardly with the rod 1 free to move, the arm 5 will slide in the longitudinal apertures 9 to its limit position (see Fig. 11) which position is reached when it engages the ends of the longitudinal apertures, while the abutment member 10 bears against the abutments 25 of the vehicle structure.

During such movement, the arm 4 carries along the abutment member 7, whereby the spring 17 is compressed and through the medium of the tube 19, the spring 22 also is compressed. The longitudinal apertures are so dimensioned that upon engagement of the tube 19 with the abutment 25 of the vehicle frame members 27, all the springs are completely compressed. If the rod 1 is pushed inwardly with the rod 3 free to move, the arms 14 and 15 will engage the left ends of the longitudinal apertures 16 and will carry along the abutment member 10, thereby compressing the right spring 17 until the stroke limit is reached in a similar manner as above described with respect to rod 3. The spring 22 is compressed through the medium of the tube 19, flange 21 and spring plate 24. Upon pull only on the rod 3, the arm 5 bears against the left end of the longitudinal aperture 9 and compresses the spring 22 in a manner similar to that previously described. Upon a one-sided pull on the rod 1, only the arms 11 and 12 carry along the abutment member 7 and compress the spring 22 through linkage comprising left spring 17, rib 18, tube 19, flange 20 and spring plate 23. In all of the foregoing examples, force is transmitted resiliently from the draft gear to the vehicle body.

If both rods 1 and 3 are pushed inwardly, the arm 4 compresses the left spring 17 through the abutment member 7 while the rod 1 carries along the abutment member 10 by means of the arms 14 and 15, thereby compressing the right spring 17. Overloading of the springs 17 is prevented by engagement of the end of the rod 3 with the end of the sleeve 2, thereby rigidly coupling the rods together (Fig. 12).

The spring 22 is not acted upon. On the application of outward pull to both rods 1 and 3,

arm 5 carries along the abutment member 10, thereby compressing the right spring 17 while the rod 1 through its arms 11 and 12 moves the abutment member 7 to the right, thereby compressing the right spring. Again the spring 22 is not affected.

In the modification disclosed in Figs. 8 to 13 inclusive, the distance between the abutment members 7 and 10 and the abutments 25 on the vehicle is less than the distance between the ends of the tube 19 and the abutments 25.

Therefore, movement of the abutment members is arrested before movement of the tube 19 and therefore compression is effected of both springs 17 as well as the spring 22. Therefore, all three springs are available for transmitting accelerating force from the draft gear to the vehicle.

I claim:

1. In draft gear for railway vehicles, a pair of aligned draft rods movable toward and away from each other from a position of rest, a lost motion connection between the inner ends of said rods limiting relative movement of said rods, resilient means tending to oppose relative movement of said rods in either direction, and resilient means interposed between said draft rods and the vehicle for transmitting force from the former to the latter, said lost motion connection and said first named resilient means being arranged concentric of and within said last named resilient means.

2. In draft gear for railway vehicles, a pair of draft rods, a lost motion connection between the inner ends of said rods, resilient means tending to oppose relative movement of said rods, additional resilient means coaxial with and surrounding said lost motion connection, followers for said last named resilient means, abutments on the vehicle engaged by said followers, and coupling means between said lost motion connection and said followers for transmitting force from the draft rods to said vehicle.

3. In draft gear for railway vehicles, a pair of draft rods, a lost motion connection between the inner ends of said rods, resilient means opposing relative movement of said rods, said lost motion connection including plates fixed to said rods, a two-part tube surrounding said lost motion connection, end flanges on said tube engaging said plates, abutments on said vehicle and each part of said tube, and resilient means interposed between said abutments.

4. In draft gear for railway vehicles, a pair of draft rods, a lost motion connection between the inner ends of said rods, resilient means opposing relative movement of said rods, said lost motion connection including plates fixed to said rods, two abutting tubular members surrounding said lost motion connection, flanges on said tubular members engaging said plates, abutments on the vehicle, said tubular members and said draft rods, followers mounted on said draft rods and said tubular members, and resilient means interposed between said followers, said followers being engageable with the abutments on said vehicle, tubular members and draft rods.

5. In draft gear for railway vehicles, a pair of rods, a lost motion connection between the inner ends of said rods, said lost motion connection comprising a tube surrounding the inner ends of said rods and having inwardly projecting abutments, followers mounted on said rods and engageable with said abutments, resilient means interposed between said followers, outwardly extending abutments on said tube, abutments on

said vehicle, followers mounted on said tube, each follower being engageable with both a tube abutment and a vehicle abutment, and resilient means interposed between said followers.

5 6. In draft gear for railway vehicles, a pair of draft rods, a lost motion connection between the inner ends of said rods, said lost motion connection comprising a sleeve on the inner end of one rod receiving the inner end of the other rod, 10 slotted abutment members slidably mounted on said sleeve, arms on said rod and sleeve extending into the slots of said abutment members, a tube surrounding said sleeve and having an inwardly projecting central annular flange, resilient means interposed between said abutment 15 members and said flange, outwardly projecting abutments on said tube, abutments on said vehicle, additional followers mounted on said tube, each follower being engageable with a tube abutment and a vehicle abutment and resilient means interposed between said last named followers. 20

7. In draft gear for railway vehicles, a pair of draft rods, a lost motion connection between the inner ends of said rods, said lost motion connection comprising a sleeve on the inner end of one rod receiving the inner end of the other rod, longitudinal slots in said sleeve, slotted abutment 25 members slidably mounted on said sleeve, arms on said rod extending through the slots in said sleeve into the slots of said abutment members, arms on said sleeve extending into the slots of said abutment members, a tube having a central inwardly projecting annular flange, springs interposed between said abutment members and 30 said flange, outwardly projecting abutments on said tube, additional followers mounted on said tube, each follower being engageable with a tube abutment and a vehicle abutment, resilient means interposed between said followers, and additional vehicle abutment members engageable by said 35 abutment members.

8. In draft gear for railway vehicles, a pair of draft rods, a lost motion connection between the inner ends of said rods, said lost motion connection comprising a sleeve on the inner end of one rod receiving the inner end of the other rod, 40 slotted abutment members slidably mounted on said sleeve, arms on said rod and sleeve extending into the slots of said abutment members, a tube surrounding said sleeve and having an in- 45

wardly projecting central annular flange, resilient means interposed between said abutment members and said flange, outwardly projecting abutments on said tube, abutments on said vehicle, additional followers mounted on said tube, each follower being engageable with a tube abutment and a vehicle abutment, and resilient means interposed between said last named followers, the distance between the abutment members and the last named vehicle abutments being less than the distance between the ends of said tube and said last named vehicle abutments. 5 10

9. In draft gear for railway vehicles, a pair of draft rods, a lost motion connection between the inner ends of said rods, said lost motion connection comprising a sleeve on the inner end of one rod receiving the inner end of the other rod, longitudinal slots in said sleeve, slotted abutment 15 members slidably mounted on said sleeve, arms on said rod extending through the slots in said sleeve into the slots of said abutment members, arms on said sleeve extending into the slots of said abutment members, a tube having a central inwardly projecting annular flange, springs interposed between said abutment members and said flange, outwardly projecting abutments on said tube, additional followers mounted on said tube, each 20 follower being engageable with a tube abutment and a vehicle abutment, resilient means interposed between said followers, and additional vehicle abutment members engageable by said abutment members, the distance between the abutment members and the last named vehicle abutments being less than the distance between the ends of said tube and said last named vehicle 25 30 35 abutments.

10. In draft gear for railway vehicles, a pair of aligned draft rods movable toward and away from each other from a position of rest, a lost motion connection between the inner ends of said rods limiting the relative movement thereof, springs coaxial with said rods and surrounding the inner ends thereof, connections between certain of said springs and said rods for opposing relative movement of the rods in either direction, and means connecting the remainder of said 40 45 springs with the vehicle and lost motion connection for transmitting force from the rods to the vehicle.

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