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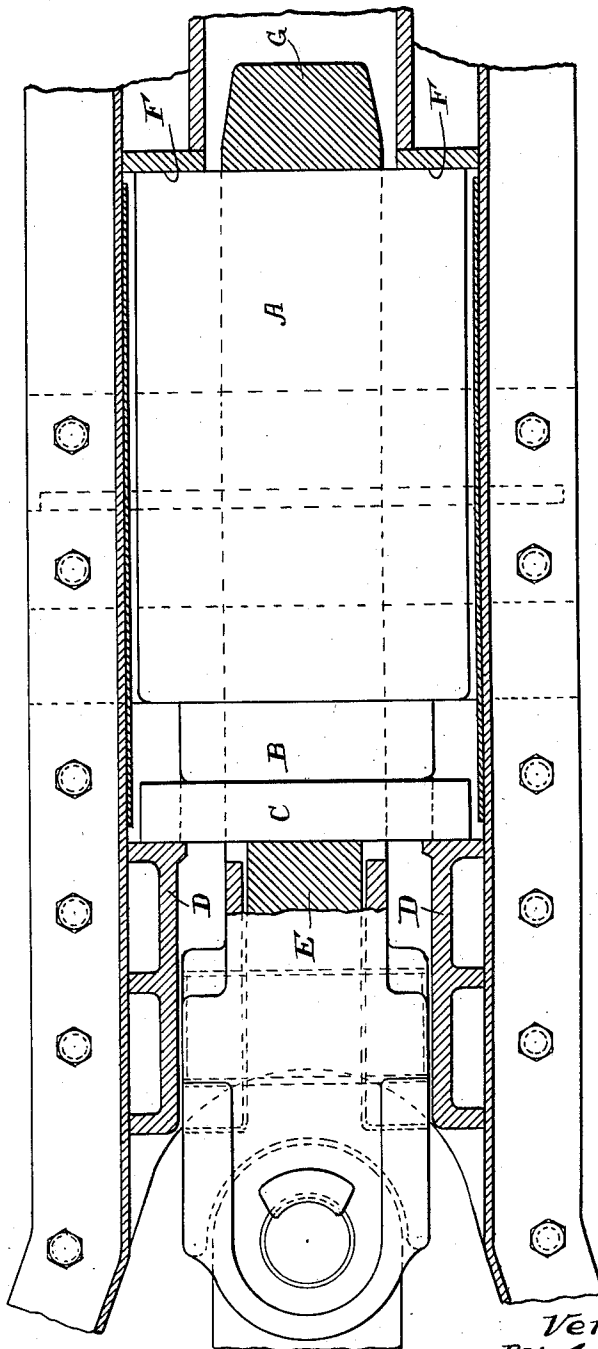
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DRAFT GEAR FOR RAILWAY DRAFT RIGGINGS

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3 Sheets-Sheet 1

Fig. 1



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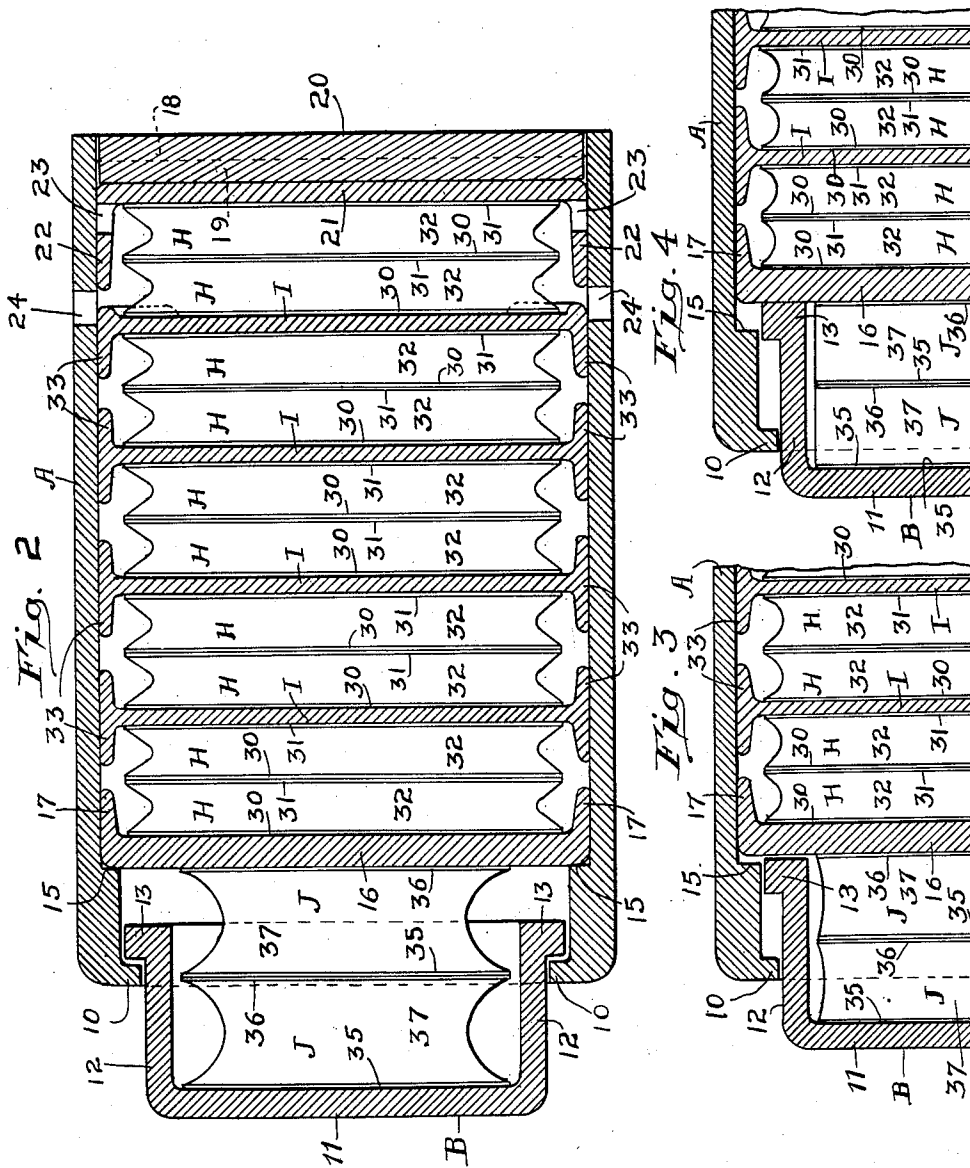
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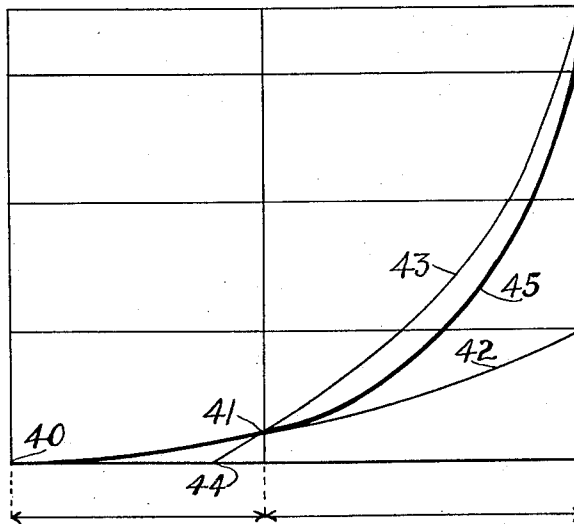
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Fig. 5



Initial Compression-Draft Gear Travel

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DRAFT GEAR FOR RAILWAY DRAFT RIGGINGS

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4 Claims. (Cl. 213—45)

This invention relates to draft gear for railway draft riggings for passenger service.

It is a main object of the invention to provide a draft gear for the heavier cars that are used in passenger service.

Another object of the invention is to provide in a draft gear for passenger service the combination of a resilient column of low capacity for cushioning minor shocks with a resilient column of higher capacity to afford greater protection to the car, and means for blocking the low resistance column after it has been compressed to a predetermined maximum extent.

Another object of the invention is to provide a self-contained draft gear for the heavier cars used in passenger service in which a main resilient column is maintained under initial compression to build up in the column a relatively high initial resistance, together with an auxiliary column independently maintained under compression to build up in that auxiliary column an initial resistance that is substantially lower than the initial resistance of the main column.

Further objects of the invention not specifically mentioned here will be apparent from the detailed description and claims which follow, reference being had to the accompanying drawings in which a preferred embodiment of the invention is shown by way of example and in which:

Figure 1 is a plan view of the gear installed in the yoke and pocket of a railway passenger car;

Figure 2 is a cross sectional view of the gear in Figure 1, taken along a horizontal plane on the median line of the gear;

Figure 3 is a fragmentary cross sectional view, showing the gear compressed to the point where the resistance of the auxiliary column just exceeds the initial resistance of the main column.

Figure 4 is a view similar to Figure 3, showing the gear with the auxiliary column completely compressed and blocked; and

Figure 5 is a diagram illustrating the operating characteristics of the gear.

Passenger equipment varies in weight from approximately 50,000 pounds for light weight suburban cars, up to 200,000 to 250,000 pounds for first class cars, such as sleeping cars, dining cars, dome cars and the like. The maximum travel of a draft gear is fixed by the rigging in which the gear is installed and is the same for all car weights.

In a draft gear for passenger service, low initial compression of the gear is desirable to permit low resistance to travel of the gear over a portion of its travel and at the same time higher resistance to the rest of the gear travel is necessary to impart desired operating characteristics to the gear, particularly when the gear is installed in the heavier passenger equipment.

In a draft gear in which the resilient means comprises only a column of rubber, special means must be provided to arrange the column so as to have low initial resistance,

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which resistance builds up gradually at a gradually increasing rate to a final value, when the gear is completely compressed, sufficiently high to afford adequate protection to the heavier passenger equipment. It is to such a gear that the present invention particularly relates.

In its preferred form, the gear of the present invention is a unitary structure in which a main column is encased in a metallic casing and maintained under initial compression therein. The column consists of a plurality of units of identical configuration and characteristics in compression. Projecting from the casing is a plunger which encases an auxiliary column composed of rubber pads of smaller area than the pads in the main column, which auxiliary pads also are thicker than the pads in the main column. The auxiliary column is independently maintained under initial compression lower than the initial compression of the main column.

The auxiliary column being of smaller area and having thicker pads than the main column offers less resistance to travel of the gear than does the main column. Through this arrangement soft cushioning of the car is achieved and many shocks may be cushioned solely by the auxiliary column.

To guard against overloading the auxiliary column by impacts that produce greater travel of the gear, means are provided for blocking the auxiliary column thereby to limit the maximum compression of it. Preferably, the means is arranged so that the auxiliary column will be blocked shortly after the pads in it have been compressed sufficiently to build up their resistance to a value slightly in excess of the initial resistance of the main column. Through this arrangement resistance of the gear increases gradually at a gradually increasing rate and the resistance of the auxiliary column blends into the resistance of the main column and the transition from compression of both columns in series to compression of the main column alone is smooth and free from shock.

Referring now to the drawings in more detail, it will be seen that the gear of the present invention consists of a metallic casing A, from one end of which is projected a plunger B that engages the front follower C of the rigging, which follower, in turn, engages the front lugs D and the coupler shank E in the usual manner. The rear end of the casing A abuts against the rear lugs F of the pocket and also against the yoke G in the usual manner.

The casing A, which is preferably rectangular and of such dimension as to fit within the vehicle pocket with a minimum of waste space, has inwardly turned flanges 10 at its open front end, which flanges define an opening through which the plunger B projects. The plunger B, which consists of a front wall 11 and rearwardly extending walls 12, is of cuplike formation and carries, at the rear end of the walls 12, outwardly projecting lugs 13 adapted to engage the flanges 10 on the casing A, thereby to limit the outward movement of the plunger.

Within the casing A are shoulders 15 against which a front follower 16 abuts, this follower being provided with rearwardly extending flanges 17 which have sliding engagement with the walls of the casing to maintain the follower aligned therein at all times.

At the rear of the casing are inwardly turned flanges 18 at the top and bottom, which flanges are engaged by flanges 19 upon the removable rear wall 20 of the casing. This rear wall construction of the casing is known in the prior art of which I am aware.

Within the casing is a rear follower 21 that abuts against the rear wall 20 and contains forwardly extending flanges 22, which are perforated at 23 to permit insertion of keys through perforations 24 in the side walls of the casing, thereby to hold the follower 21 forwardly

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to permit insertion of the rear wall 20 in the casing in known manner.

Disposed between the front follower 16 and the rear follower 21 is a main resilient column composed of units H that are formed into groups by aligners I in known manner. Preferably, each of the units H consists of a front metallic plate 30, a rear metallic plate 31, and a solid pad of rubber 32 disposed between the plates and bonded thereto. Preferably also, the edges of the pads 32 are formed concavely to provide flow space into which the rubber of the pad may be displaced when the unit is compressed. The aligners I are preferably provided with flanges 33 which engage the side walls of the casing to maintain the column aligner therein under all conditions.

The auxiliary column consists of units J which, in the example shown, are two in number, each being of construction similar to the units H, having front plates 35, rear plates 36, and pads of rubber 37 disposed therebetween and bonded thereto. It will be noted that the plates 35 and 36 are smaller than the plates 30 and 31, and that the pads of rubber 37 are substantially thicker than the pads 32.

When the gear is assembled in the usual manner, it is placed with its open end downwardly, plunger B is inserted in the casing and allowed to project therefrom, and units J are then put in place, after which front follower 16 is inserted. The main column, consisting of units H and aligners I, is then built up in the casing and when all of the units have been placed therein the column will extend an appreciable distance above the back end of the casing, which is now disposed uppermost. Pressure is applied to the column to compress it, thereby to build up in the auxiliary unit J an initial resistance by compressing those units until the front follower 16 engages the shoulders 15. The main column is compressed sufficiently to align the openings 23 in the rear follower 21 with the openings 24 in the casing, thereby to permit insertion of keys for locking the column in compressed condition. Pressure is removed and the rear wall 20 inserted in the casing, after which pressure is reapplied, the locking keys are removed from the aligned openings 23 and 24, and the pressure relieved to complete the assembly of the gear.

When the gear is installed in the yoke and pocket of the vehicle, plunger B is moved inwardly into the normal position in which it is shown in Figure 2. It will be noted that the lugs 13 on the plunger are spaced away from the flanges 10 on the casing. This initial position of the auxiliary unit permits some expansion thereof until lugs 13 engage flanges 10, thereby insuring that the gear will remain tight in the pocket and yoke, even though that pocket be worn slightly out of standard length.

As will be seen in Figure 3, as the gear is compressed to telescope plunger B inwardly into the casing, resistance in the units J is increased to a point equal to the initial resistance in the main column before the rear ends of the walls 12 of the plunger engage the front follower 16. This is evidenced by movement of the front follower 16 off of the shoulders 15 against which it is normally forced by the main column. Further compression of the gear forces the plunger B into the casing sufficiently to cause the rear end of the walls 12 of the plunger to engage the front follower 16. This limits the compression of the units J and occurs at a time when the plunger still projects a substantial distance out of the casing. Additional forces acting upon the plunger are transmitted through the engagement of walls 12 thereof, with the front follower 16, to move that follower rearwardly, thereby to compress the units H in the main column.

Thus it will be seen that in the gear shown by way of example, movement of the plunger B into the casing is resisted solely by the units J in the auxiliary column until the resistance of that column equals the initial resistance of the main column. This equalization of resist-

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ances is shown to occur when the plunger B has made approximately one half of its maximum. Further inward movement of the plunger B compresses both columns in series until the walls 12 of the plunger engage the front follower 16. Preferably, approximately one third of the plunger movement remains when this engagement occurs. Since the engagement of the plunger with the front follower prevents further compression of the auxiliary column, the remaining travel of the plunger is resisted solely by the main column. This arrangement blends the resistances of the auxiliary and main columns so that the plunger movements are free from shocks.

As will be seen in Figure 5, with both the main and auxiliary columns in relaxed condition, the resistance of the column is zero, as indicated at point 40. The initial compression of the columns during assembly of the gear builds up an initial resistance on the plunger, as indicated at point 41. If the main column were to be composed of units identical with those in the auxiliary column, the resistance built up during working travel of the gear would follow curve 42 to the right of point 41. Such a gear would have a maximum capacity too low for the purpose intended. Curve 43 represents the build-up in resistance as the main column of the gear is compressed. It will be noted that the zero resistance point 44 lies close to point 41 on curve 43 since only a small amount of compression is necessary to build up in the main column the initial resistance represented by point 41. Curve 45 represents the build-up of resistance of the gear of the present invention. While the maximum capacity is lowered somewhat by the inclusion of the low capacity auxiliary column, it has been found to be ample for the use intended.

Having thus complied with the statutes and shown and described a preferred embodiment of my invention, what I consider new and desire to have protected by Letters Patent is pointed out in the appended claims.

I claim:

1. A unitary draft gear for railway draft rigging for passenger service, comprising: a metallic casing open at one end and closed at the other end by a removable end wall; a plunger telescoped in said casing and projecting from the open end thereof; shoulders within said casing adjacent said plunger; a front follower disposed against said shoulders; a main resilient column disposed between said follower and said rear end wall and compressed therebetween to provide in the column a high initial resistance; an auxiliary column operable in buff and draft disposed between said plunger and said front follower and compressed therebetween to provide in the column an initial resistance of value lower than the initial resistance of the main column; and flanges on said plunger moved into engagement with said front follower after said auxiliary column has been compressed to predetermined minimum thickness and the resistance of the auxiliary column thereby increased to a value slightly greater than the initial resistance of the main column.

2. A draft gear for railway draft rigging for passenger service, comprising: a casing; a rear wall and longitudinally spaced apart, rearwardly facing internal shoulders in said casing; a main resilient column in said casing; a front follower at the front end of said column; means including said front follower engaging the rear ones of said shoulders and said rear wall for maintaining said column under compression to provide therein an initial resistance; an auxiliary resilient column disposed at one end of said main column in alignment therewith and operable both in buff and draft; a plunger consisting of a front wall disposed against the front end of said auxiliary column and side walls disposed alongside thereof; outwardly projecting lugs on said side walls; means including said front follower and said lugs on said side walls engaged with the front ones of said internal shoulders for maintaining said auxiliary column

under compression to provide therein an initial resistance that is lower than the initial resistance of the main column; means including the draft rigging for compressing said columns; and means including said side walls and front follower for limiting the compression of the auxiliary column to a predetermined amount.

3. A draft gear as specified in claim 2, in which the main resilient column comprises a plurality of units each of which consists of a pair of metal plates and a pad of rubber disposed between and bonded to said plates; and in which the auxiliary column comprises a plurality of units each of which consists of a pair of metal plates and a pad of rubber disposed between and bonded to said plates; and in which the plates and pads in the aux-

iliary column have smaller area than the plates and pads in the main column.

4. A draft gear as specified in claim 3, in which the rubber pads in the auxiliary column are thicker than the pads in the main column.

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