

April 19, 1966

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3,246,771

CUSHION COUPLERS FOR RAILWAY CARS

Filed Sept. 1, 1964

6 Sheets-Sheet 1

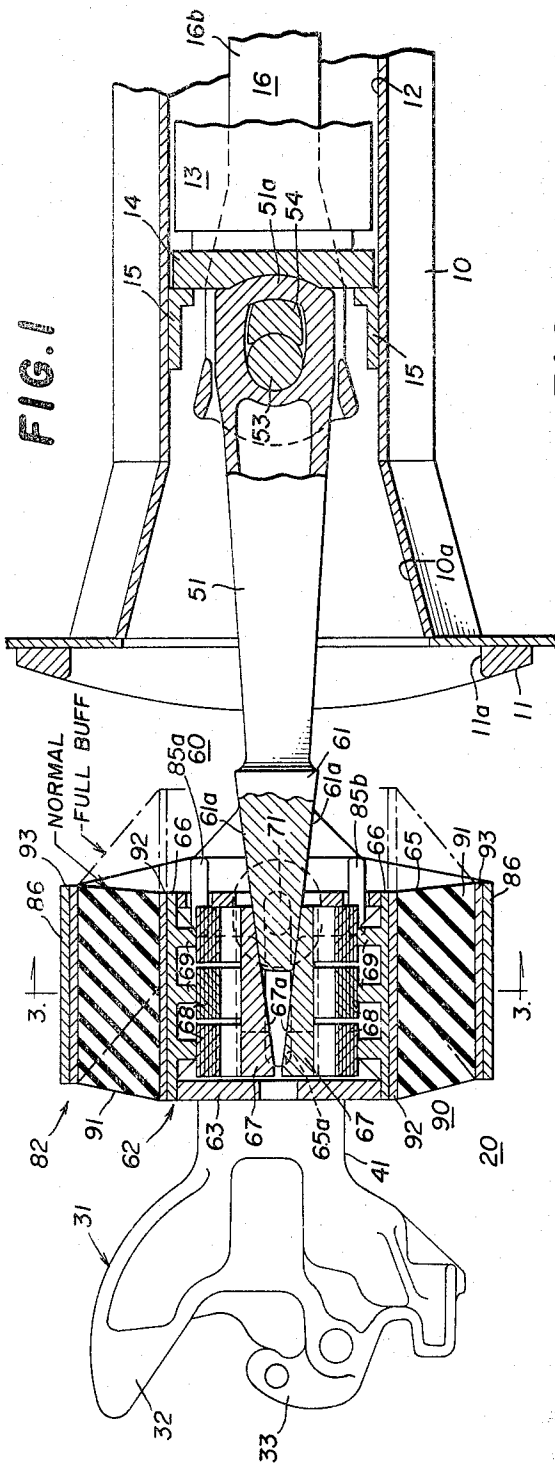
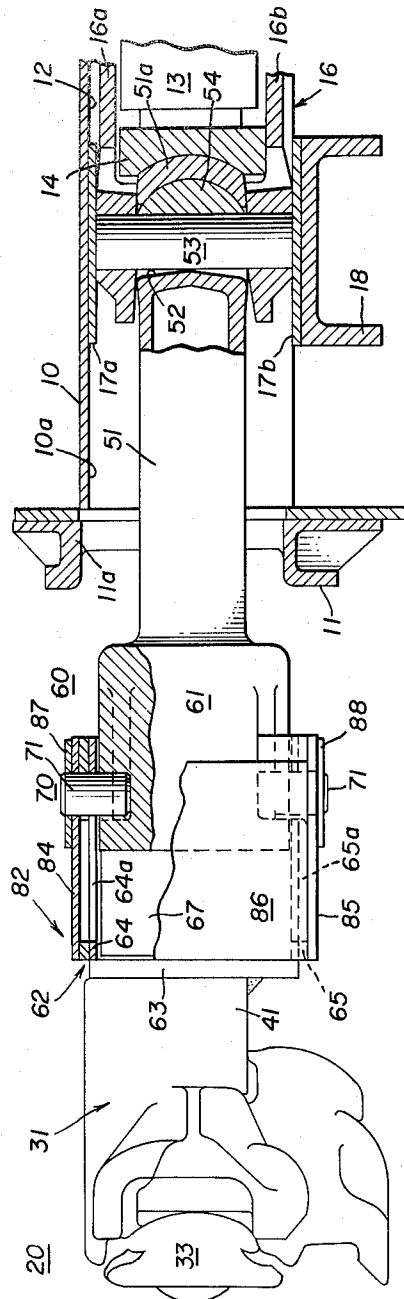


FIG. 2



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FIG. 3

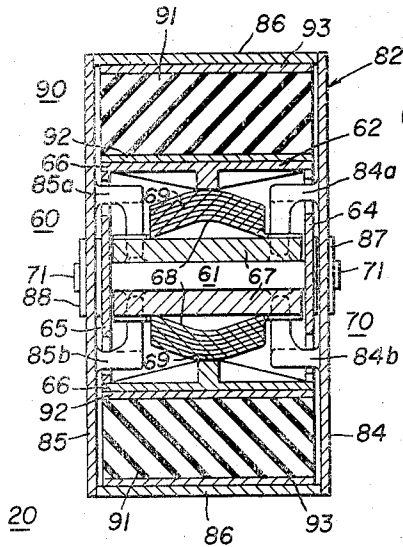


FIG. 4

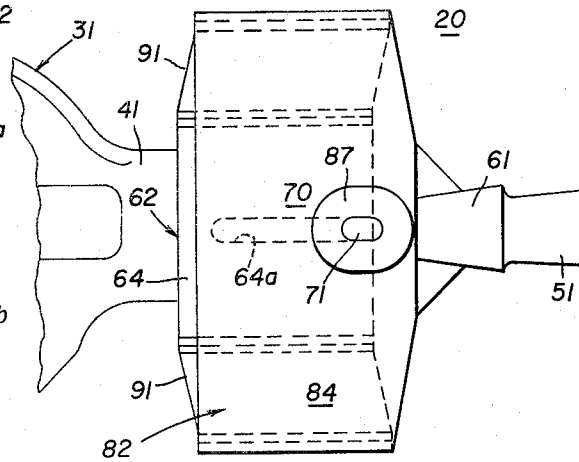
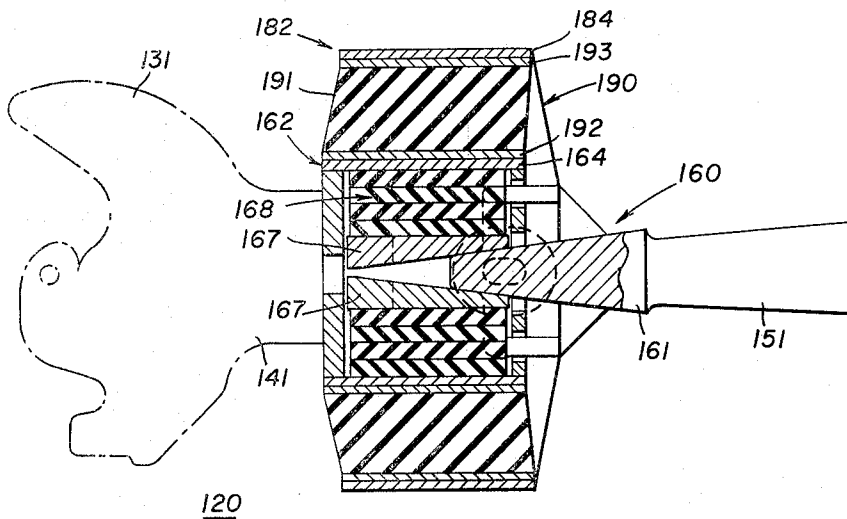


FIG. 5



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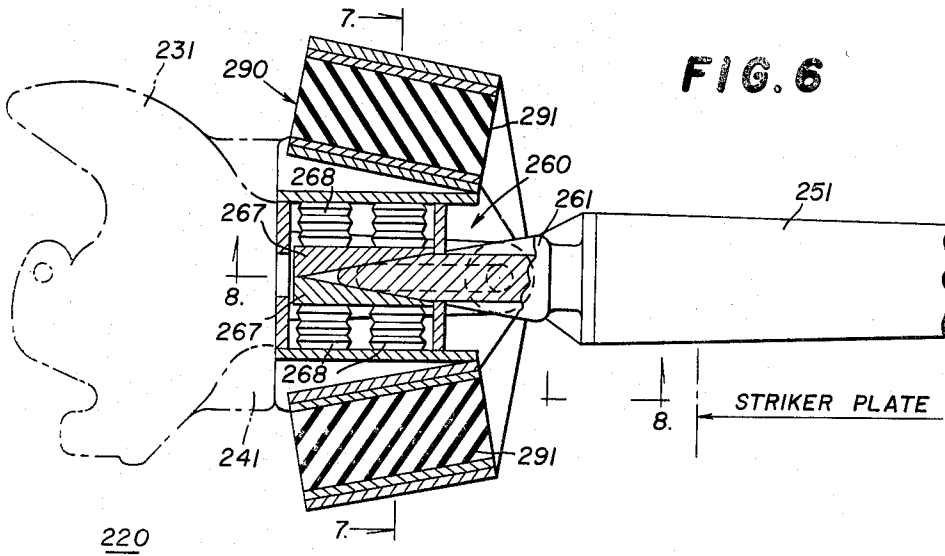
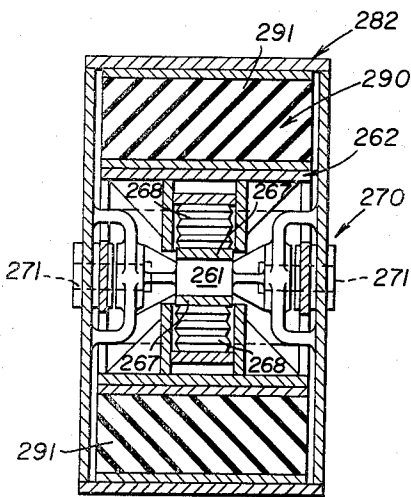


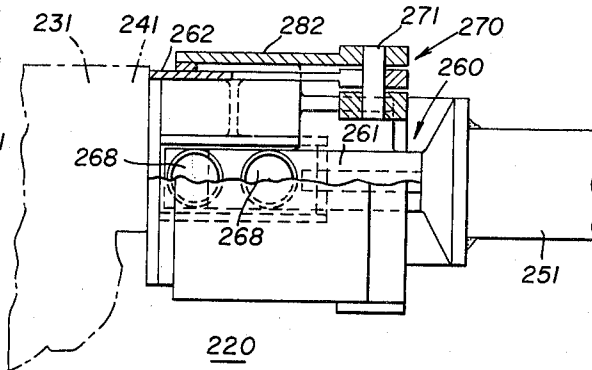
FIG. 6

FIG. 7



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FIG. 8



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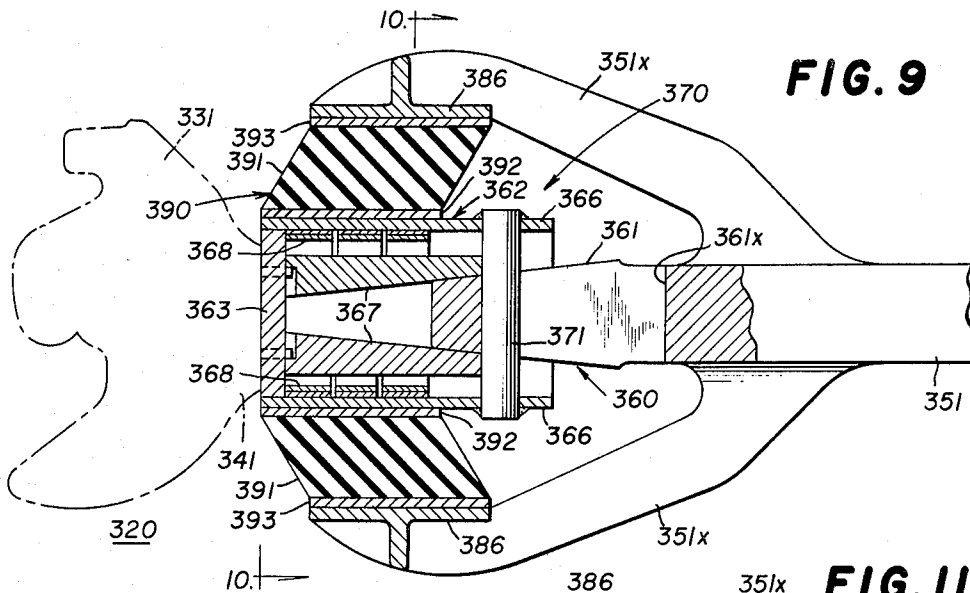


FIG. 9

FIG. 10

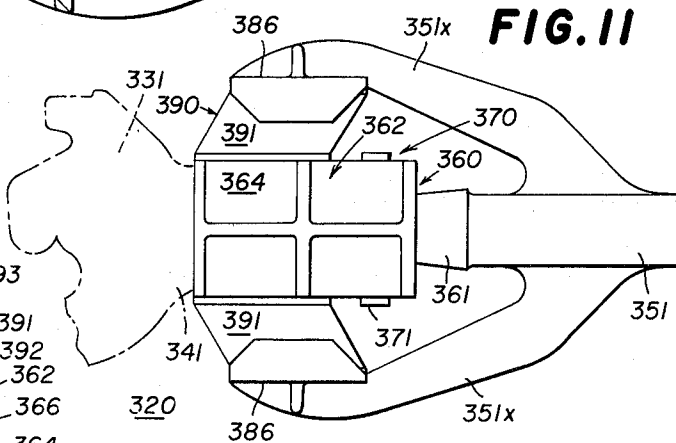
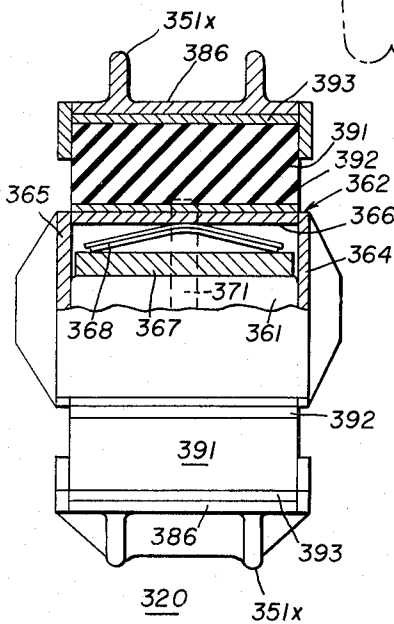
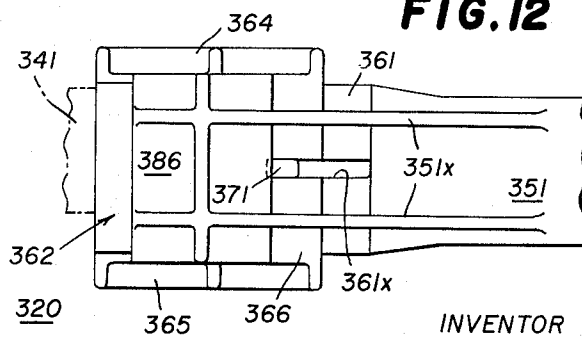


FIG. 11

FIG. 12



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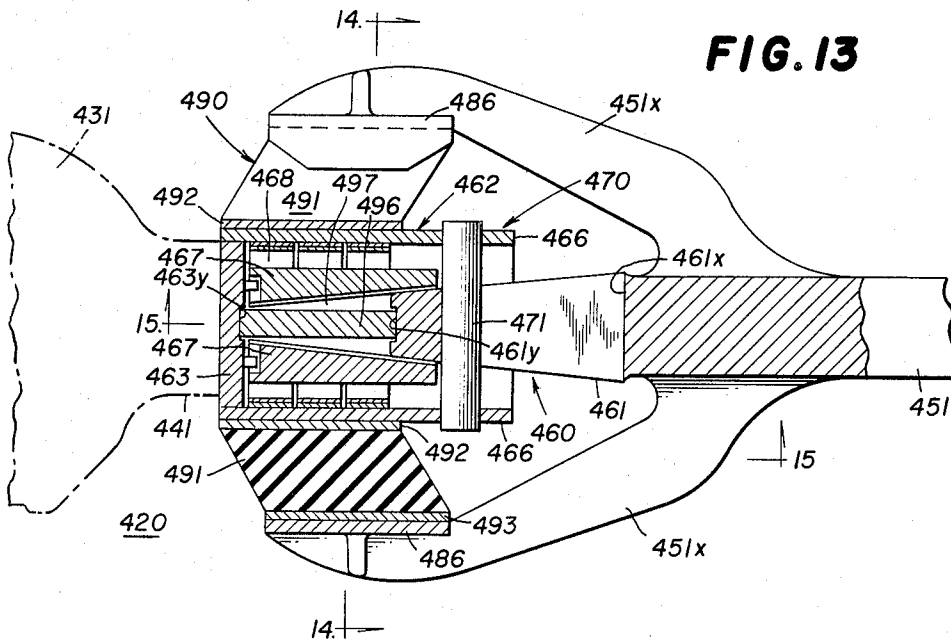
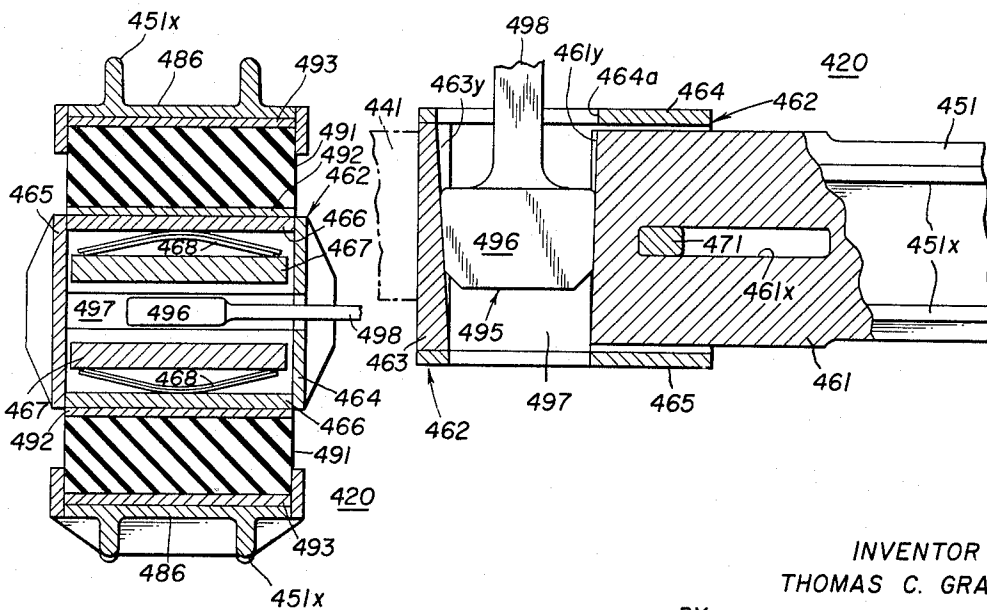


FIG. 13

FIG. 14

FIG. 15



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CUSHION COUPLERS FOR RAILWAY CARS
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23 Claims. (Cl. 213—22)

The present invention relates to cushion couplers for railway cars, and more particularly to improved cushion couplers of the general character of that disclosed and claimed in the copending application of Doedat Clejan, Serial No. 281,632, filed May 20, 1963, now Patent No. 3,176,857, granted April 6, 1965.

In the Clejan application there is disclosed a coupler that may be installed in a conventional railway car, either as original equipment in a new such car or as replacement equipment in an old such car, without shop modification of the underframe of the railway car; which coupler is of improved construction and arrangement, comprising a coupling head, a primary shank secured to the coupling head, a secondary shank adapted to be detachably connected to any conventional draft gear arranged in the corresponding pocket provided in the end of the center sill of a conventional railway car, lost-motion mechanism inter-connecting the two shafts and mounting the same for limited relative longitudinal movements and establishing a normal position for the primary shank relative to the secondary shank, and cushion mechanism also interconnecting the two shanks and biasing the primary shank into its normal position and resiliently opposing inward longitudinal movement of the primary shank out of its normal position. In the coupler, the lost-motion mechanism is so constructed and arranged that it accommodates substantially no outward longitudinal movement of the primary shank out of its normal position and the previously mentioned limited inward longitudinal movement of the primary shank out of its normal position. Thus, a draft force applied to the coupling head is transmitted to the associated draft gear by the lost-motion mechanism and independently of the cushion mechanism; on the other hand, a buff force applied to the coupling head is transmitted to the associated draft gear by the cushion mechanism and independently of the lost-motion mechanism. Accordingly, this cushion coupler effects no substantial increase, in series with the associated draft gear, of the resiliency of application of a draft force to the underframe of the railway car, and effect substantial increase, in series with the associated draft gear, of the resiliency of application of a buff force to the underframe of the railway car.

While these cushion couplers are very advantageous since they greatly minimize lading damage incident to transportation thereof in the associated railway cars, they are subject to the criticism that under certain operating conditions they permit of undesirable oscillation between two railway cars that are coupled by two corresponding such cushion couplers.

Accordingly, it is a general object of the present invention to provide a cushion coupler of the character described that further comprises friction mechanism interconnecting the two shanks noted and arranged frictionally to oppose inward longitudinal movement of the primary shank out of its normal position, whereby some of the kinetic energy of a moving railway car is absorbed in the friction mechanism incident to the application of a buff force upon the coupling head, as is involved in the usual coupling of one railway car to another, whereby the absorption of kinetic energy in the friction mechanism prevents undesirable oscillation, without interfering with the highly advantageous resiliency of the cooperating cushion mechanism.

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Another object of the invention is to provide a cushion coupler of the character described and of simple and economical construction and arrangement.

A further object of the invention is to provide a cushion coupler of the character described, wherein a draft force applied to the draft head is transmitted from the primary shank to the secondary by the lost-motion mechanism and independently of both the cushion mechanism and the friction mechanism, and wherein a buff force applied to the draft head is transmitted from the primary shank to the secondary shank jointly by the cushion mechanism and the friction mechanism acting in parallel relation and independently of the lost-motion mechanism.

Yet another object of the invention is to provide in a cushion coupler of the construction specified, an improved arrangement of the friction mechanism, so that it progressively exerts increased frictional opposition or drag to inward longitudinal movement of the primary shank, as it is so moved out of its normal position, whereby the amount of energy frictionally absorbed by or dissipated in the friction mechanism is related to the magnitude of the movement of the primary shank, wherein the energy thus dissipated is materially increased as the amplitude of the movement mentioned is increased, with the result that the damping factor of the friction mechanism is self-regulating when the cushion coupler is involved in the oscillation of two coupled railway cars.

Still a further object of the invention is to provide a cushion coupler of the construction specified, wherein the cushion mechanism and the friction mechanism act in parallel relation between the two shanks noted, so that as the friction factor of the friction mechanism is increased the same exerts an increased longitudinal thrust from the primary shank to the secondary shank, incident to the application of a buff force to the coupling head, and so that the cushion mechanism acts as the dominant thrust transmitter.

A further object of the invention is to provide in a railway car, draft rigging comprising the combination of a conventional draft gear and a cushion coupler of the construction specified.

Further features of the invention pertain to the particular arrangement of the elements of the railway car coupler and of the other elements of the railway car draft rigging into which it is incorporated, whereby the above-outlined and additional operating features thereof are attained.

The invention, both as to its organization and method of operation, together with further objects and advantages thereof, will best be understood by reference to the following specification, taken in connection with the accompanying drawings, in which:

FIGURE 1 is a plan view, partly in section, of railway car draft rigging including a railway car coupler and embodying the present invention;

FIG. 2 is a side elevational view, partly in section, of the railway car draft rigging, as shown in FIG. 1;

FIG. 3 is a vertical sectional view of the railway car coupler of FIGS. 1 and 2, this view being taken in the direction of the arrows along the line 3—3 in FIG. 1;

FIG. 4 is a fragmentary plan view of the central portion of the railway car coupler, as shown in FIGS. 1 and 2;

FIG. 5 is a fragmentary plan view, partly in section, similar to FIG. 1, of the railway car coupler, and illustrating a modified form of resilient element that may be provided in the friction mechanism incorporated in the cushion coupler;

FIG. 6 is a fragmentary plan view, partly in section, of a modified form of the railway car coupler;

FIG. 7 is a vertical sectional view of the railway car coupler of FIG. 6, this view being taken in the direction of the arrows along the line 7—7 in FIG. 6;

FIG. 8 is a fragmentary side elevational view, partly in section, of the railway car coupler of FIGS. 6 and 7;

FIG. 9 is a fragmentary plan view, partly in section, of another modified form of the railway car coupler;

FIG. 10 is a vertical sectional view of the railway car coupler of FIG. 9, this view being taken in the direction of the arrows along the line 10—10 in FIG. 9;

FIG. 11 is another fragmentary reduced plan view of the railway car coupler of FIGS. 9 and 10;

FIG. 12 is a fragmentary reduced side elevational view of the railway car coupler of FIGS. 9 to 11, inclusive;

FIG. 13 is a fragmentary plan view, partly in section, of another modified form of the railway car coupler;

FIG. 14 is a vertical sectional view of the railway car coupler of FIG. 13, this view being taken in the direction of the arrows along the line 14—14 in FIG. 13;

FIG. 15 is another vertical sectional view of the railway car coupler of FIGS. 13 and 14, this view being taken in the direction of the arrows along the line 15—15 in FIG. 13;

FIG. 16 is a fragmentary plan view, partly in section, similar to FIG. 13, of another modified form of the railway car coupler;

FIG. 17 is a fragmentary plan view, partly in section, similar to FIG. 13, of another modified form of the railway car coupler; and

FIG. 18 is a fragmentary plan view, partly in section, similar to FIG. 13, of another modified form of the railway car coupler.

Referring now to FIGS. 1 and 2, there is diagrammatically illustrated one end of a conventional railway car that includes an underframe that incorporates a center sill 10 having an open outer end indicated at 10a and a striker plate 11 rigidly carried by the extreme outer end of the center sill 10 and having an opening 11a therethrough communicating with the adjacent open outer end 10a of the center sill 10. The outer portion of the center sill 10 disposed immediately inwardly of the striker plate 11 is hollow and has a draft gear pocket 12 formed therein; and a draft gear 13 is arranged in the pocket 12; which draft gear 13 comprises a portion of the draft rigging, as explained more fully hereinafter; and which draft gear 13 may be of any conventional type. The front end of the draft gear 13 cooperates in the usual manner with a front follower 14, and the rear end of the draft gear 13 cooperates in the usual manner with a rear follower, not shown. In turn, the front follower 14 cooperates in the usual manner with front draft lugs 15 rigidly secured to the adjacent interior portion of the center sill 10, and the rear follower cooperates in the usual manner with rear draft lugs, not shown, rigidly secured to the adjacent interior portion of the center sill 10. The draft gear 13 and the cooperating front and rear followers are embraced by the usual yoke 16 of substantially U-shaped configuration and including upper and lower arms 16a and 16b respectively positioned above and below the draft gear 13 and projecting forwardly in the hollow center sill 10 toward the outer open end 10a thereof.

Further, the draft rigging comprises a railway car coupler 20 that includes a coupling head 31, a primary shank 41, and a secondary shank 51. The coupling head 31 is preferably of conventional A.A.R. Type E construction, including a jaw 32, a pivotally mounted knuckle 33, a knuckle thrower, not shown, a lock, not shown, a lock-lift assembly, not shown, and the other usual appurtenances; which organization of elements is not described in further detail in the interest of brevity.

The secondary shank 51 is arranged in the outer open end 10a of the center sill 10 and projects through the opening 11a provided in the striker plate 11; and more particularly, the inner end of the secondary shank 51 is

operatively connected to the yoke 16 and cooperates with the front follower 14, all in the usual manner. Specifically, an upstanding opening 52 is formed in the inner end of the secondary shank 51 that receives an upstanding connecting pin 53. The opposite ends of the connecting pin 53 are arranged in two aligned openings respectively formed in the outer ends of the upper and lower arms 16a and 16b of the yoke 16; and the extreme outer ends of the connecting pin 53 respectively engage in sliding relation upper and lower wear plates 17a and 17b. The upper wear plate 17a is carried by the adjacent top wall structure of the outer end of the center sill 10; and the lower wear plate 17b is carried by an adjacent lower yoke support 18 that is carried by the adjacent outer end of the center sill 10. The outer surface of the extreme rear end or strap portion 51a of the secondary shank 51 is of generally semi-spherical configuration and is received in a corresponding cavity formed in the adjacent front surface of the front follower 14, in the usual manner; and moreover, a bearing block 54 is arranged in the opening 52 at the rear side of the upstanding connecting pin 53 and in interposed relation with respect to the rear side of the connecting pin 53 and the adjacent front side of the strap portion 51a of the extreme rear end of the secondary shank 51. The rear side of the bearing block 54 and the front side of the strap portion 51a of the extreme rear end of the secondary shank 51 that are disposed in contact with each other are provided with the usual substantially semi-spherical surfaces so as to accommodate articulation of the secondary shank 51 in the horizontal direction about the pivot pin 53 and with respect to the front follower 14, all in a conventional manner.

Referring now to FIGS. 1 to 4, inclusive, the extreme front end of the secondary shank 51 terminates in a longitudinally extending and forwardly tapered wedge 61, forming a part of a friction mechanism 60, and employed for a purpose more fully described hereinafter. The extreme rear end of the primary shank 41 terminates in a box-like structure 62, also forming a part of the friction mechanism 60, and including an upstanding front end wall 63, a top wall 64, a bottom wall 65, and a pair of laterally spaced-apart side walls 66, whereby the structure 62 has an open rear end. The extreme rear end of the primary shank 41 is directed rigidly secured to the front end wall 63, and the front end wall 63 is disposed forwardly of the extreme front end of the wedge 61 with the walls 64, 65 and 66 rigidly secured to the front end wall 63 and to each other and projecting rearwardly from the front end wall 63 into surrounding relation with the front portion of the wedge 61; whereby the walls 63, 64, 65 and 66 are laterally spaced from the wedge 61. In the arrangement, the longitudinal center lines of the shanks 41 and 51 are disposed along the longitudinal center line of the coupler 20 and the center sill 10, with the rear end of the primary shank 41 and the front end of the secondary shank 51 in essentially aligned longitudinally spaced-apart cooperating relation with each other.

Also, the front portion of the wedge 61 carries a pair of vertically aligned pins 71, forming a part of lost-motion mechanism 70; which pins 71 respectively project upwardly and downwardly from the corresponding upper and lower surfaces of the wedge 61; and which pins 71 are respectively rigidly anchored in place in corresponding holes formed in the upper and lower portions of the wedge 61. Further, another box-like structure 82 is provided that is disposed in surrounding laterally spaced-apart relation with the box-like structure 62; which box-like structure 82 comprises corresponding top and bottom walls 84 and 85 and corresponding laterally spaced-apart side walls 86. As best shown in FIG. 3, the box-like structure 62 is arranged within the box-like structure 82, and both of these structures have a generally rectangular configuration in lateral cross-section. In the arrangement, the top and bottom walls 84 and 85 of the outer box 82

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are disposed closely adjacent to and laterally outwardly of the respective top and bottom walls 64 and 65 of the inner box 62, while the side walls 86 of the outer box 82 are disposed well laterally outwardly with respect to the respective side walls 66 of the inner box 62. Thus, two laterally spaced-apart and outwardly disposed pockets are respectively defined between the side walls 66 and the side walls 86 of the corresponding inner and outer boxes 62 and 82.

In the arrangement, the outer box 82 is securely fastened to the wedge 61 by the pair of pins 71. More particularly, the top pin 71 projects laterally upwardly into a corresponding hole formed in the adjacent top wall 84 of the outer box 82 and is rigidly secured in place by a cooperating washer-like element 87 fixed both to the surrounded end of the cooperating top pin 71 and to the adjacent portion of the top wall 84, and the bottom pin 71 projects laterally downwardly into a corresponding hole formed in the adjacent bottom wall 85 of the outer box 82 and is secured in place by a cooperating washer-like element 88 fixed both to the surrounded end of the cooperating bottom pin 71 and to the adjacent portion of the bottom wall 85. Thus, the outer box 82 is rigidly secured to the wedge 61 by the pins 71 and is disposed in surrounding laterally spaced-apart relation with respect to the inner box 62 that is rigidly secured to primary shank 41. Thus, the wedge 61 and the outer box 82 are rigidly fixed to the outer end of the secondary shank 51 and the inner box 62 is rigidly fixed to the inner end of the primary shank 41. Moreover, the primary shank 41, and its attachments, is movable longitudinally with respect to the secondary shank 51, and its attachments; which relative longitudinal movements of the shanks 41 and 51 are employed for a purpose more fully described hereinafter.

Reverting to the lost-motion mechanism 70, the same is of the pin-slot type and includes the pins 71, as previously noted; and further a pair of longitudinally extending elongated slots 64a and 65a are respectively formed in the corresponding top and bottom walls 64 and 65 of the inner box 62 and respectively receive the corresponding top and bottom pins 71, respectively. The slots 64a and 65a are arranged in vertical alignment with each other and in a vertical plane substantially coincident with the longitudinal center line of the coupler 20. The slots 64a and 65a have a predetermined longitudinal dimension; whereby the lost-motion mechanism 70 establishes and accommodates only limited longitudinal movement of the two boxes or structures 62 and 82 relative to each other. In the arrangement, each of the pins 71 has a cross-section that is substantially rectangular, so as to prevent rotation of the inner box 62 upon the pins 71 and the consequent sagging of the coupling head 31 out of a generally horizontal positions in longitudinal alignment with the center lines of the secondary shank 51 and the draft gear 13. When the coupling head 31 is moved into its extreme forward position as shown in solid lines in FIGS. 1 and 2, the rear ends of the slots 64a and 65a engage the respective pins 71 so as to establish this outward limit position; which outward limit position of the inner box 62 relative to the outer box 82 constitutes the normal position thereof. When the coupling head 31 is moved into its extreme rearward position, as indicated in broken lines in FIG. 1, the front ends of the slots 64a and 65a engage the respective pins 71, so as to establish this inward limit position.

Further the coupler 20 comprises cushion mechanism 90 interconnecting the boxes 62 and 82; which cushion mechanism includes a pair of resilient units 91, each consisting essentially of a block of elastomeric material, such, for example, as live rubber. More particularly, the two resilient units 91 are respectively arranged in the two pockets respectively defined between the two side walls 66 of the inner box 62 and the two side walls 86 of the outer box 82, whereby the two resilient units 91 are arranged in laterally spaced-apart relation on the opposite outer

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sides of the side walls 66 of the inner box 62 and on the opposite inner sides of the side walls 86 of the outer box 82, and whereby the resilient units 91 are surrounded by the outer box 82. Specifically the block 91 of live rubber is suitably bonded to the adjacent sides of a pair of metal plates 92 and 93 respectively arranged on opposite sides of the block 91; and the two plates 92 and 93 respectively engage the adjacent surfaces of the two cooperating side walls 66 and 86 of the corresponding boxes 62 and 82. In each resilient unit 91, the inner plate 92 is suitably secured rigidly to the adjacent engaged side wall 66 of the inner box 62, and the outer plate 93 is suitably secured rigidly to the adjacent engaged side wall 86 of the outer box 82.

In the arrangement, the blocks 91 resiliently bias the inner box 62 into its outer limit or normal position, as shown in solid lines in FIG. 1, thereby to urge or bias the coupling head 31 forwardly or outwardly, as illustrated. When the coupling head 31 is moved inwardly, the primary shank 41 and the inner box 62 are moved therewith, whereby the inner box 62 is moved inwardly with respect to the outer box 82, so that the two blocks 91 are subjected essentially to shear stresses, in an obvious manner, in order to produce corresponding shear strains or deformations of the blocks 91, as indicated in broken lines in FIG. 1, with the result that the blocks 91 resiliently oppose such inward movement of the inner box 62 out of its normal position and with respect to the outer box 82. Of course, inward longitudinal movement of the inner box 62 produces an inward thrust through the resilient units 91 upon the outer box 82, with the result that the secondary shank 51 is moved longitudinally inwardly to subject the draft gear 13 to compression in the manner previously explained.

Reverting to the friction mechanism 60, the same further comprises a pair of friction shoes 67 arranged in laterally spaced-apart position within the inner box 62 and respectively positioned on the opposite sides of the wedge 61. More particularly, the two outer sides of the wedge 61 are respectively provided with hard polished friction surfaces 61a that are arranged in two corresponding upstanding and forwardly converging planes. Similarly, the two inner sides of the two friction shoes 67 are respectively provided with hard polished friction surfaces 67a that are also arranged in the two upstanding and forwardly converging planes mentioned; and the two surfaces 61a respectively frictionally engage the two surfaces 67a, as best shown in FIG. 1.

Further, the friction mechanism 60 comprises two groups of resilient elements 68 respectively arranged in cooperating relation with the two friction shoes 67; each of the groups including three longitudinally spaced-apart resilient elements 68 arranged in side-by-side relation; and each of the individual resilient elements 68 essentially comprises a stack of leaf springs. The two groups of resilient elements 68 respectively act between the corresponding friction shoes 67 and the corresponding side walls 66 of the inner box 62, whereby the friction shoes 67 are urged inwardly toward each other and into respective frictional engagements with the opposite sides of the wedge 61, as previously explained.

The inner surface of each side wall 66 of the inner box 62 is provided with a group of three structures 69 of cross-like form and respectively cooperating with the three resilient elements 68 in the associated group. These structures 69 project laterally inwardly toward the adjacent resilient elements 68 and into respective engagements therewith, as best shown in FIGS. 1 and 3. In the arrangement, the structures 69 not only reinforce the adjacent side wall 66 carrying the same, but they accommodate individual movement or adjustment of the respectively associated resilient elements 68 in their compressed positions between the adjacent friction shoe 67 and the adjacent side wall 66.

When the inner box 62 occupies its normal position

with respect to the outer box 82, as illustrated in FIG. 1, the wedge 61 is withdrawn very substantially from between the cooperating friction shoes 67, so that the force with which the friction shoes 67 are urged inwardly by the leaf springs 68 is greatly minimized, thereby to minimize the friction factor between the friction surfaces 67a and 61a. When the inner box 62 is moved out of its normal position longitudinally inwardly with respect to the outer box 82 the wedge 61 is thrust more substantially between the cooperating friction shoes 67, so that they move laterally outwardly away from each other effecting more compression of the leaf springs 68; whereby the leaf springs 68 react to increase the force with which the friction shoes 67 are urged inwardly thereby, whereby the friction factor between the friction surfaces 67a and 61a is increased. Of course, inward longitudinal movement of the inner box 62 produces an inward thrust through the elements 67 and 61, with the result that the secondary shank 51 is moved longitudinally inwardly to subject the draft gear 13 to compression in the manner previously explained. Moreover, the cooperation between the elements 67 and 61 frictionally oppose inward movement of the inner box 62 out of its normal position, and cause kinetic energy to be absorbed in or dissipated by the elements 67 and 61 for a purpose more fully explained hereinafter.

It is of course apparent that when the inner box 62 is subsequently moved longitudinally outwardly and back into its normal position, as illustrated in FIG. 1, reverse effects take place, so that the wedge 61 is withdrawn more substantially from between the friction shoes 67, whereby the friction factor between the elements 67 and 61 is again reduced and minimized, as previously explained.

In the longitudinal movements of the inner box 62 out of its normal position, as illustrated in FIG. 1, the relative longitudinal movements of the friction shoes with respect to the wedge 61, as described above, causes rocking or pivoting movements of the friction shoes 67 within the inner box 62 and with respect to the wedge 61 and about the rear ends of the friction shoes; and for purpose of guiding and controlling the friction shoes 67 in their rocking or pivoting movements noted guide structure is provided between the top and bottom walls 84 and 85 of the outer box 82 and the rear ends of the friction shoes 67, as best shown in FIGS. 1 and 3. More particularly, the top wall 84 of the outer box 82 carries two laterally spaced-apart depending lugs 84a and 84b that respectively project through two elongated cooperating and longitudinally extending and aligned slots provided in the adjacent top wall 64 of the inner box 62; which lugs 84a and 84b then extend longitudinally forwardly and then laterally inwardly toward each other; and which lugs 84a and 84b then respectively project into and terminate in two corresponding holes respectively provided in the friction shoes 67 respectively adjacent to the top rear ends thereof. Similarly, the bottom wall 85 of the outer box 82 carries two laterally spaced-apart upstanding lugs 85a and 85b that respectively project through two elongated cooperating and longitudinally extending and aligned slots provided in the adjacent bottom wall 65 of the inner box 62; which lugs 85a and 85b then extend longitudinally forwardly and then laterally inwardly toward each other; and which lugs 85a and 85b then respectively project into and terminate in two corresponding holes respectively provided in the friction shoes 67 respectively adjacent to the bottom rear ends thereof. This arrangement of the lugs 84a, 84b 85a and 85b, as described, not only accommodates and guides the previously described rocking or pivoting movements of the friction shoes 67, but also insures that the friction shoes 67 do not stick to the wedge 61 as it is moved longitudinally with respect thereto, as described above; which action is insured by the anchoring of the friction shoes 67 to the top and bottom walls 84 and 85

of the outer box 82 by the cooperating lugs 84a, 84b, 85a and 85b.

Considering now the composite operation of the coupler 20, when a draft force is applied to the coupling head 31, the primary shank 41 and the inner box 62 move forwardly therewith, whereby the top and bottom walls 64 and 65 of the inner box 62 act upon the pins 71 to transmit the draft force directly to the wedge 61 and consequently to the secondary shaft 51, whereby the draft force is thus transmitted through the lost-motion mechanism 70 and independently of both the cushion mechanism 90 and the friction mechanism 60. On the other hand, when a buff force is applied to the coupling head 31, the primary shank 41 and the inner box 62 move rearwardly therewith, whereby the slots 64a and 65a respectively provided in the top and bottom walls 64 and 65 of the inner box 62 ride rearwardly with respect to the pins 71 carried by the wedge 61, with the result that the inner box 62 move rearwardly or inwardly with respect to the outer box 82. This rearward or inward movement of the inner box 62 out of its normal position, as illustrated in FIG. 1, effects operations of the cushion mechanism 90 and the friction mechanism 60 in parallel relation. Specifically, in the cushion mechanism 90, the blocks 91 are deformed, longitudinally as indicated in broken lines in FIG. 1, whereby they impart a resilient longitudinal rearward or inward thrust upon the outer box 82 and thus upon the secondary shank 51. Simultaneously, in the friction mechanism 60, the friction shoes 67 sliding longitudinally rearwardly or inwardly with respect to the wedge 61 impart a friction longitudinal rearward or inward thrust upon the wedge 61 and thus upon the secondary shank 51. Accordingly, the buff force is thus transmitted through the two mechanisms 90 and 60 acting in parallel relation with each other and independently of the lost-motion mechanism 70.

Hence, a draft force is transmitted from the coupling head 31 via the lost-motion mechanism 70 to the draft gear 13 and thence to the center sill 10; and a buff force is transmitted from the coupling head 31 via the cushion mechanism 90 and the friction mechanism 60 acting in parallel relation to the draft gear 13 and thence to the center sill 10. Thus, the two mechanisms 90 and 60 act in parallel relation with each other and in series relation with the draft gear 13 to transmit a buff force, and the draft gear 13 acts alone to transmit a draft force. Accordingly, the draft rigging is "very" soft for transmitting a buff force and is "standard" soft for transmitting a draft force. Of course, these overall actions are advantageous, since very soft couplers prevent lading damage incident to switching and coupling of railway cars in making up a train, and since standard soft couplers prevent the accumulation of undue and undesirable train slack in the draft of the train and minimize undue slack braking in braking or speed checking of the train in operation.

Reexamining the action of the coupler 20 in train service, there is some tendency for two coupled railway cars to oscillate toward and away from each other, because of the resiliency of the cushion mechanisms 90 incorporated in the coupler 20. However, undesirable oscillation in the coupler 20 and between the shanks 41 and 51 is prevented by the frictional damping action of the friction mechanism 60 incorporated in the coupler, since the friction mechanism absorbs or dissipates energy incident to each "collapsing" movement of the shanks 41 and 51 toward each other, the absorbed energy mentioned being transformed into heat appearing in the frictionally engaging elements 61 and 67. Also, the action of the resilient elements 68 to increase very materially the friction factor of the friction mechanism 60 as a result of a collapsing movement of the shanks 41 and 51 is very advantageous, since the friction mechanism 60 becomes progressively "stiffer" as the friction factor of the friction mechanism 60 is increased, with the result that in the event a severe buff force is encountered by the

coupling head 31, the friction mechanism 60 grows progressively stiffer, as the shanks 41 and 51 are collapsed. Thus, the friction mechanism 60 is "indeed" stiff by the time the lost-motion mechanism 70 travels from its forward limit position (its normal position) into its rearward limit position, so as to eliminate undue shocks in the coupler 20, and particularly in the lost-motion mechanism 70, as the coupler 20 is moved between its draft-closure position and its buff-closure position, as established by the two corresponding limit positions of the lost-motion mechanism 70.

In the design of the coupler 20 it is advantageous to preset the dimensions of the elements to obtain predetermined and desired initial compression of the resilient elements 68 between the friction shoes 67 and the structures 69, so as to obtain a desired initial friction factor in the friction mechanism 60 when the lost-motion mechanism 70 occupies its normal or draft-closure position, as illustrated in FIG. 1. Of course, the rate of increase of the friction factor of the friction mechanism 60 is determined largely by the stiffness of the resilient elements 68, the slopes of the friction surfaces 61a and 67a, and the travel of the lost-motion mechanism 70. Also, the dimensions of the elements are preset to obtain predetermined and desired initial compression of the resilient units 91 incorporated in the cushion mechanism 90, so as to obtain a desired initial stiffness in the cushion mechanism 90 when the lost-motion mechanism 70 occupies its draft-closure position, as illustrated in FIG. 1. Of course, the rate of change of the shear factor of the resilient blocks 91 is determined largely by the shear modulus of the blocks and the travel of the lost-motion mechanism 70.

In an illustrative example of the coupler 20: the longitudinal distance between the pulling face of the coupling head 31 of the type "F" and the vertical centerline of the opening 52 provided in the rear end of the secondary shank 51 was 60", the pulling face of the coupling head 31 was located 15½" forwardly of the front surface of the front end wall 63; the front surface of the front end wall 63 was located 14½" forwardly of the rear portions of the lugs 84a and 85a at the projections thereof from the top and bottom walls 84 and 85 of the outer box 82; and the center-line of the opening 52 was located 30" rearwardly of the rear portions of the lugs 84a and 85a. The outside box 82 had a height over the outer surfaces of the top and bottom walls 84 and 85 of 15" and a width over the outer surfaces of the side walls 86 of 29" and a length between the front and rear edges of the side walls 86 of 12". The inside box 62 had a height over the outside surfaces of the top and bottom walls 64 and 65 of 13" and a width over the outer surfaces of the side walls 66 of 13¾" and a length between the front and rear edges of the side walls 66 of 12½". The other elements of the coupler 20 had dimensions that were generally related to each other and to the principal dimensions as set forth above in accordance with scale of FIGS. 1 to 4, inclusive.

Referring to FIG. 5, the railway car coupler 120 there illustrated is substantially identical to the coupler 20, as described above in conjunction with FIGS. 1 to 4, inclusive, except that in this case the corresponding outer and inner boxes 182 and 162 are substantially annular and are located in substantially concentric positions with relation to each other; and also the corresponding resilient elements 190 are substantially annular and are arranged between the corresponding annular walls 164 and 184 of the respective outer and inner boxes 182 and 162. Specifically the elements 191, 192 and 193 are annular, as noted above. In the coupler 120, the coupling head 131, the primary shank 141, the secondary shank 151, the wedge 161 and the friction shoes 167 respectively correspond to the elements 31, 41, 51, 61 and 67 of the coupler 20.

Also, in the coupler 120 there is another significant modification in that the resilient element 168 takes the form

of an annular array or stack of cylinders of elastomeric material such, for example, as live rubber; and the stack of cylinders comprising the composite resilient element 168 surrounds or embraces the cooperating friction shoes 167 and is arranged within the annular wall 164 of the inner box 152. Specifically, the resilient element 168 is arranged in initial compression between the friction shoes 167 and the wall 168 of the inner box 162, so as resiliently to urge the friction shoes 167 into initial engagements with the wedge 161 for the purpose, as previously explained.

The fundamental mode of operation of the coupler 120 is the same as that of the coupler 20 and is not reiterated in the interest of brevity.

Referring to FIGS. 6 to 8, inclusive, the railway car coupler 220 there illustrated is of fundamentally the same construction as the coupler 20, as described above in conjunction with FIGS. 1 to 4, inclusive, except that in this case the resilient units 268 incorporated in the friction mechanism 260 are in the form of stacks of disks of elastomeric material, such, for example, as live rubber. In the coupler 220, the elements 231, 241, 251, 260, 261, 262, 267, 270, 271 and 282 are substantially identical to the respectively corresponding elements 31, 41, etc., in the coupler 20. Of course, the resilient units 268 urge the cooperating friction shoes 267 into frictional engagements with the wedge 261 for the purpose previously explained.

The fundamental mode of operation of the coupler 220 is the same as that of the coupler 20 and is not reiterated in the interest of brevity.

Referring to FIGS. 9 to 12, inclusive, the railway car coupler 320 there illustrated is of fundamentally the same construction as the coupler 20, as described above in conjunction with FIGS. 1 to 4, inclusive; whereby the coupler 320 comprises the corresponding and substantially identical elements: 331, 341, 351, 360, 361, 362, 367 and 368. In this case, the outer box is eliminated, or is at least reduced to two laterally spaced-apart side plates 386 disposed on opposite sides of the side walls 366 of the box-like structure 362. The box 362 also includes the top wall 364, the bottom wall 365 and the front end wall 363, the rear end of the short primary shank 341 being suitably rigidly secured to the front face of the front end wall 363. The two side plates 386 are spaced well laterally outwardly from the side walls 366 of the box 362, and are respectively carried by a pair of arms 351x projecting longitudinally forwardly and laterally outwardly from the secondary shank 351 and rigidly carried thereby; whereby the elements 361 and 351x are formed rigidly, and preferably integrally, with the secondary shank 351.

In this case the cushion mechanism 390 essentially comprises the two resilient units 391 respectively arranged between the opposite side 366 of the box 362 and the corresponding side plates 386. Each resilient unit 391 essentially comprises a block of elastomeric material, such, for example, as live rubber; the opposite sides of each block 391 are respectively securely bonded to the respectively adjacent inner and outer plates 392 and 393; the inner plates 392 are securely fastened to the adjacent side walls 366 of the box 362; and the outer plates 393 are securely fastened to the adjacent side plates 386.

In this case, the friction mechanism 360 comprises the wedge 361, the friction shoes 367, and the resilient elements 388 acting between the side walls 366 of the box 362 and the friction shoes 367, the resilient elements 368 being in the form of the stacks of leaf springs.

Also, in this case, the lost-motion mechanism 370 comprises the elongated substantially horizontally disposed and laterally extending pin 371 that is rigidly secured in place at the opposite outer ends thereof in holes respectively formed in the side walls 366 of the box 362 and in which the opposite ends of the pin 371 project. A substantially horizontally positioned and longitudinally extending elongated slot 361x is formed in the rear end of the wedge 361 and the adjacent front end of the secondary shank 351 and receives the pin 371, thereby to establish the front and

rear limit positions for the box 362 with respect to the wedge 361 and to the secondary shank 351. The front limit position of the box 362 constitutes the normal position thereof; and the box 362 is biased into its normal position, as illustrated in FIG. 9, by the resilient blocks 391 forming a part of the cushion mechanism 390.

In view of the above description it will be understood that in the coupler 320 the forms of the lost-motion mechanism 370, the cushion mechanism 390 and the friction mechanism 360 operate to perform the functions of the respectively corresponding mechanisms 70, 90 and 60 in the coupler 20; and the fundamental mode of operation of the coupler 320 is the same as that of the coupler 20 and is not reiterated in the interest of brevity.

Referring to FIGS. 13 to 15, inclusive, the railway car coupler 420 there illustrated is of fundamentally the same construction as the coupler 320, as described above in conjunction with FIGS. 9 to 12, inclusive; whereby the coupler 420 comprises the corresponding and substantially identical elements: 431, 441, 451, 451x, 460, 461, 461x, 462, 463, 464, 465, 466, 470, 471, 486, 490, 491, 492 and 493.

In this case the coupler 420 further comprises locking mechanism 495 that finds no counterpart in the coupler 320; which locking mechanism 495 essentially comprises a bolt 496 that is selectively movable through a substantially vertical and laterally extending slot 464a formed in the top wall 464 into and out of a chamber 497 defined mutually between the two friction shoes 467, and between the front end wall 463 and the extreme front end of the wedge 461. More particularly, the bolt 496 is provided with an elongated upstanding handle 498 accommodating the ready insertion and withdrawal of the bolt 496 with respect to the chamber 497 and through the slot 464a formed in the top wall 464 of the box 462; and the bolt 496 occupies a lock position when it is in the chamber 497, and occupies an unlock position when it is out of the chamber 497. For the purpose of guiding the movements of the bolt 496 between its lock and unlock positions, the rear surface of the front end wall 463 has a slot or track 463y formed therein, as shown in FIG. 15, and similarly, the front end of the wedge 461 has a slot or track 461y formed therein, as shown in FIG. 15. The bolt 496 is slightly forwardly tapered; and similarly, the tracks 463y and 461y are forwardly tapered toward each other; whereby the movement of the bolt 496 into its lock position along the aligned tracks 463y and 461y causes the same to be wedged in place or position, so as to prevent undesirable movement of the bolt 496 out of its lock position disposed in the chamber 496. However, the bolt 496 may be normally operated into its unlock position (removed from the chamber 497) employing the handle 498.

Considering now the mode of operation of the coupler 420, it is noted that when the bolt 496 occupies its unlock position, the operation of the coupler 420 is identical to that of the coupler 320; whereby a draft force is transmitted from the primary shank 441 to the secondary shank 451 by the lost-motion mechanism 470 and independently of the two mechanisms 490 and 460; and whereby a buff force is transmitted from the primary shank 441 to the secondary shank 451 jointly by the cushion mechanism 490 and the friction mechanism 460 and independently of the mechanism 470. On the other hand, when the bolt 496 occupies its lock position, both of the mechanisms 490 and 460 are locked out of service; whereby a draft force is transmitted from the primary shank 441 to the secondary shank 451 by the lost-motion mechanism 470 and independently of the two mechanisms 490 and 460; and whereby a buff force is transmitted from the primary shank 441 to the secondary shank 451 by the locking mechanism 495 and independently of the three mechanisms 470, 490 and 460.

The lock-out of the mechanisms 490 and 460 by the locking mechanism 495, when the bolt 496 occupies its

lock position, is effected simply by the wedged position of the bolt 496 between the front end wall 463 and the front end of the wedge 461; whereby inward longitudinal movement of the primary shank 441, as a result of the application of a buff force to the coupling head 431, simply causes the box 462 to move longitudinally inwardly and such motion to be transmitted directly between the front end wall 463 and the wedge 461 through the bolt 496. Hence, the two shanks 441 and 451 move together when the locking mechanism 495 occupies its lock position.

The incorporation of the locking mechanism 495 into the coupler 420 renders it possible for a trainman to convert the action thereof between standard coupler action (with the locking mechanism 495 in its lock position) and cushion coupler action, as described above (with the locking mechanism 495 in its unlock position).

Referring to FIG. 16, the railway car coupler 520 there illustrated is of fundamentally the same construction as the coupler 320, as described above in conjunction with FIGS. 9 to 12, inclusive; whereby the coupler 520 comprises the corresponding and substantially identical elements: 531, 541, 551, 551x, 560, 561, 562, 566, 567, 570 and 571.

In this case, the cushion mechanism 590 essentially comprises a pair of helical coil springs 591 that are respectively disposed on opposite sides of the box 562 and respectively arranged between the arms 551x and the opposite side walls 566 of the box 562. Specifically, the side walls 566 respectively carry two laterally outwardly directed flanges 566y adjacent to the front ends thereof, and the two arms 551x respectively carry two laterally outwardly directed abutments 551y adjacent to the rear ends thereof. The two coil springs 591 are arranged in predetermined compression between the respective flanges 566y and the respective abutments 551y; whereby the coil springs 591 bias the box 562 into its forward limit position, the normal position thereof, and thus bias the lost-motion mechanism 570 into its draft closure position, as illustrated.

It will, of course, be apparent that the coil springs 591 incorporated in the cushion mechanism 590 operate in a direct manner to prevent the transmission of severe longitudinal shocks from the primary shank 541 to the secondary shank 551, when buff forces are applied to the coupling head 531.

The fundamental mode of operation of the coupler 520 is the same as that of the coupler 320 and is not reiterated in the interest of brevity.

Referring to FIG. 17 the railway car coupler 620 there illustrated is of fundamentally the same construction as the coupler 520, as described above in conjunction with FIG. 16; whereby the coupler 620 comprises the corresponding and substantially identical elements: 631, 641, 651, 651x, 651y, 660, 661, 662, 666, 666y, 667, 670 and 671.

In this case, the cushion mechanism 690 essentially comprises a pair of resilient units 691 that are respectively disposed on opposite sides of the box 662 and respectively arranged between the arms 651x and the opposite side walls 666 of the box 662. The two resilient units 691 are identical and each thereof is of composite construction including a longitudinally extending sealed casing 691a defining a cylinder 691b and containing a co-operating perforated piston 691c, as well as a body 691d of hydraulic fluid, such, for example, as oil. The piston 691c is affixed to a longitudinally extending shaft 691e that projects through packing or sealing glands 691f arranged in the opposite end walls of the casing 691a. The extreme front end of the shaft 691e terminates in a head 691g that engages the adjacent flange 666y carried by the side wall 666 of the box 652; and the front end of the shaft is surrounded by a helical coil spring 691h arranged in compression between the head 691g and the front end wall of the casing 691a, whereby the rear end wall of the

casing 691a is urged into engagement with the adjacent abutment 651y carried by the adjacent arm 651x. Thus, the resilient units 691 incorporated in the cushion mechanism 690 bias the box 652 into its forward limit position, the normal position thereof, and thus bias the lost-motion mechanism 670 into its draft closure position, as illustrated.

In the operation of the coupler 620, when a buff force is applied to the coupling head 631, the box 662 moves longitudinally inwardly, whereby the flanges 666y carried by the side walls 666 of the box 662 effect operation of the two cushion units 691 incorporated in the cushion mechanism 690. Specifically, in each resilient unit 691, the flange 666y carried by the side wall 666 of the box 662 acts upon the head 691g, as the box 662 is moved longitudinally inwardly, to impart corresponding inward movement to the shaft 691e. This inward movement of the head 691g effects further compression of the coil spring 691h; and this inward movement of the shaft 691e causes the perforated piston 691c to act upon the body 691d of hydraulic fluid in the cylinder 691b. The coil spring 691h resiliently opposes the inward movement of the box 662 by its action upon the head 691g; and the piston 691c acts upon the hydraulic fluid contained in the rear portion of the cylinder 691b so as to cause the same to pass through the perforations in the piston 691c and into the front portion of the cylinder 691b. Hence, there is a frictional opposition to the 691d flow of the hydraulic fluid by virtue of the relatively small cross-sectional areas of the perforations in the piston 691c, so that the resilient unit 691 exerts frictional opposition to the inward movement of the box 662. Also, energy is expended upon the hydraulic fluid 691d by the piston 691c, so as to damp any possible oscillation of the box 662.

Of course, the friction mechanism 660 operates in the manner previously described, and in parallel relation with the cushion mechanism 690.

Again the lost-motion mechanism 670 accommodates no outward movement of the box 662 beyond its normal position; as illustrated; whereby draft forces applied to the coupling head 631 are transmitted from the primary shank 641 to the secondary shank 651 by the lost-motion mechanism 670 and independently of the two mechanisms 690 and 660, as previously noted.

After a buff force upon the coupling head 631 subsides, the coil spring 691h in the resilient unit 691 effects the return of the box 662 back into its normal position, as illustrated, this return movement of the box 662 being longitudinally outward and against the action of the piston 691c upon the hydraulic fluid 691d in the cylinder 691b.

The consequences of the above described movements of the box 662 incorporated in the coupler 620 are the same as previously described in connection with the coupler 320 of FIGS. 9 to 12, inclusive, and are not reiterated in the interest of brevity.

Referring to FIG. 18 the railway car coupler 720 there illustrated is of fundamentally the same construction as the coupler 520, as described above in conjunction with FIG. 16; whereby the coupler 720 comprises the corresponding and substantially identical elements 731, 741, 751, 751x, 760, 761, 762, 766, 767, 770 and 771.

In this case, the cushion mechanism 790 essentially comprises a pair of resilient units 791 that are respectively disposed on opposite sides of the box 762 and respectively arranged between the arms 751x and the opposite side walls 766 of the box 762. Specifically, each of the resilient units 791 comprises a pair of longitudinally extending and laterally spaced-apart plates 791a and 791b respectively securely fastened to the adjacent side wall 766 of the box 762 and to the adjacent arms 751x. Also, each of the units 791 includes a group of laterally extending and longitudinally spaced-apart leaf springs 791c, the opposite ends of the individual leaf springs 791c being securely fixed to the respectively adjacent ones of the plates 791a and 791b.

In this case inward longitudinal movement of the box 762 effects flexing of the springs 791c incorporated in the two resilient units 791, whereby this movement is resiliently opposed by the units 791. Each individual spring 791c is flexed longitudinally of the unit 791 and thus from end to end of the individual spring 791c in substantially a cantilever action.

The fundamental mode of operation of the coupler 720 is the same as that of the coupler 320 and is not reiterated in the interest of brevity.

In view of the foregoing, it is apparent that there has been provided a railway car coupler of improved construction and arrangement that comprises a primary shank connected to a coupling head, a secondary shank connectable to conventional draft gear arranged in the under-frame of an associated railway car, lost-motion mechanism interconnecting the shanks and establishing a normal position for the primary shank and accommodating no substantial outward movement of the primary shank from its normal position upon application of a draft force upon the draft head and accommodating limited inward movement of the primary shank from its normal position upon application of a buff force upon the draft head, cushion mechanism interconnecting the shanks and resiliently controlling inward movement of the primary shank from its normal, and friction mechanism interconnecting the shanks and frictionally controlling inward movement of the primary from its normal position.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be understood that various modifications may be made therein, and it is intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A railway car coupler comprising a coupling head adapted to receive the usual draft and buff forces, a primary shank connected at the outer end thereof to said coupling head, a secondary shank arranged inwardly of and in substantial longitudinal alignment with said primary shank, lost-motion mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank and mounting said shanks for limited relative longitudinal movements and establishing a normal position for said primary shank with respect to said secondary shank, cushion mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank and biasing said primary shank into its normal position and resiliently opposing inward longitudinal movement of said primary shank out of its normal position, friction mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank, said friction mechanism including frictionally engaging elements opposing inward longitudinal movement of said primary shank out of its normal position, said lost-motion mechanism being arranged to accommodate no substantial outward longitudinal movement of said primary shank out of its normal position and to accommodate said limited inward longitudinal movement of said primary shank out of its normal position, whereby a draft force applied to said coupling head is transmitted from said primary shank to said secondary shank by said lost-motion mechanism and independently of both said cushion mechanism and said friction mechanism, whereby a buff force applied to said coupling head is transmitted from said primary shank to said secondary shank jointly by said cushion mechanism and by said friction mechanism acting in parallel relation with each other and independently of said lost-motion mechanism, and a connector carried by the inner end of said secondary shank and adapted to be connected to cooperating conventional draft gear.

2. A railway car coupler comprising a coupling head adapted to receive the usual draft and buff forces, a primary shank connected at the outer end thereof to said

coupling head, a secondary shank arranged inwardly of and in substantial longitudinal alignment with said primary shank, lost-motion mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank and mounting said shanks for limited relative longitudinal movements and establishing a normal position for said primary shank with respect to said secondary shank, cushion mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank and biasing said primary shank into its normal position and resiliently opposing inward longitudinal movement of said primary shank out of its normal position, friction mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank, said friction mechanism including frictionally engaging elements opposing inward longitudinal movement of said primary shank out of its normal position, said lost-motion mechanism being arranged to accommodate no substantial outward longitudinal movement of said primary shank out of its normal position and to accommodate said limited inward longitudinal movement of said primary shank out of its normal position, whereby a draft force applied to said coupling head is transmitted from said primary shank to said secondary shank by said lost-motion mechanism and independently of both said cushion mechanism and said friction mechanism, whereby a buff force applied to said coupling head is transmitted from said primary shank to said secondary shank jointly by said cushion mechanism and by said friction mechanism acting in parallel relation with each other and independently of said lost-motion mechanism, and a connector carried by the inner end of said secondary shank and adapted to be connected to cooperating conventional draft gear, said cushion mechanism including a block of elastomeric material having opposing faces respectively securely fastened to said shanks, whereby inward longitudinal movement of said primary shank out of its normal position subjects said block to shear stresses, so that said block is strained resiliently to oppose such inward movement of said primary shank.

3. A railway car coupler comprising a coupling head adapted to receive the usual draft and buff forces, a primary shank connected at the outer end thereof to said coupling head, a secondary shank arranged inwardly of and in substantial longitudinal alignment with said primary shank, lost-motion mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank and mounting said shanks for limited relative longitudinal movements and establishing a normal position for said primary shank with respect to said secondary shank, cushion mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank and biasing said primary shank into its normal position and resiliently opposing inward longitudinal movement of said primary shank out of its normal position, friction mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank, said friction mechanism including frictionally engaging elements opposing inward longitudinal movement of said primary shank out of its normal position, said lost-motion mechanism being arranged to accommodate no substantial outward longitudinal movement of said primary shank out of its normal position and to accommodate said limited inward longitudinal movement of said primary shank out of its normal position, whereby a draft force applied to said coupling head is transmitted from said primary shank to said secondary shank by said lost-motion mechanism and independently of both said cushion mechanism and said friction mechanism, whereby a buff force applied to said coupling head is transmitted from said primary shank to said secondary shank jointly by said cushion mechanism and by said friction mechanism acting in parallel relation with each other and independently of said lost-motion mechanism, and a connector carried by the inner end of said secondary shank and

adapted to be connected to cooperating conventional draft gear, said cushion mechanism including a helical coil spring having opposite ends respectively acting against said shanks, whereby inward longitudinal movement of said primary shank out of its normal position subjects said coil spring to compression stresses, so that said coil spring is strained resiliently to oppose such inward movement of said primary shank.

4. A railway car coupler comprising a coupling head adapted to receive the usual draft and buff forces, a primary shank connected at the outer end thereof to said coupling head, a secondary shank arranged inwardly of and in substantial longitudinal alignment with said primary shank, lost-motion mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank and mounting said shanks for limited relative longitudinal movements and establishing a normal position for said primary shank with respect to said secondary shank, cushion mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank and biasing said primary shank into its normal position and resiliently opposing inward longitudinal movement of said primary shank out of its normal position, friction mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank, said friction mechanism including frictionally engaging elements opposing inward longitudinal movement of said primary shank out of its normal position, said lost-motion mechanism being arranged to accommodate no substantial outward longitudinal movement of said primary shank out of its normal position and to accommodate said limited inward longitudinal movement of said primary shank out of its normal position, whereby a draft force applied to said coupling head is transmitted from said primary shank to said secondary shank by said lost-motion mechanism and independently of both said cushion mechanism and said friction mechanism, whereby a buff force applied to said coupling head is transmitted from said primary shank to said secondary shank jointly by said cushion mechanism and by said friction mechanism acting in parallel relation with each other and independently of said lost-motion mechanism, and a connector carried by the inner end of said secondary shank and adapted to be connected to cooperating conventional draft gear, said cushion mechanism including a hydraulic unit of the piston-cylinder type and respectively acting upon said shanks and containing a body of hydraulic fluid, whereby inward longitudinal movement of said primary shank out of its normal position causes said piston to act upon the contained body of hydraulic fluid, so that said hydraulic unit resiliently opposes such inward movement of said primary shank.

5. A railway car coupler comprising a coupling head adapted to receive the usual draft and buff forces, a primary shank connected at the outer end thereof to said coupling head, a secondary shank arranged inwardly of and in substantial longitudinal alignment with said primary shank, lost-motion mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank and mounting said shanks for limited relative longitudinal movements and establishing a normal position for said primary shank with respect to said secondary shank, cushion mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank and biasing said primary shank into its normal position and resiliently opposing inward longitudinal movement of said primary shank out of its normal position, friction mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank, said friction mechanism including frictionally engaging elements opposing inward longitudinal movement of said primary shank out of its normal position, said lost-motion mechanism being arranged to accommodate no substantial outward longitudinal movement of said primary shank out of its normal position and

to accommodate said limited inward longitudinal movement of said primary shank out of its normal position, whereby a draft force applied to said coupling head is transmitted from said primary shank to said secondary shank by said lost-motion mechanism and independently of both said cushion mechanism and said friction mechanism, whereby a buff force applied to said coupling head is transmitted from said primary shank to said secondary shank jointly by said cushion mechanism and by said friction mechanism acting in parallel relation with each other and independently of said lost-motion mechanism, and a connector carried by the inner end of said secondary shank and adapted to be connected to cooperating conventional draft gear, said cushion mechanism including a plurality of leaf springs each having the opposite ends thereof respectively acting against said shanks, whereby inward longitudinal movement of said primary shank out of its normal position subjects said leaf springs to lateral deflecting stresses in parallel relation, so that said leaf springs are strained resiliently to oppose by parallel action said inward movement of said primary shank.

6. A railway car coupler comprising a coupling head adapted to receive the usual draft and buff forces, a primary shank connected at the outer end thereof to said coupling head, a secondary shank arranged inwardly of and in substantial longitudinal alignment with said primary shank, lost-motion mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank and mounting said shanks for limited relative longitudinal movements and establishing a normal position for said primary shank with respect to said secondary shank, cushion mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank and biasing said primary shank into its normal position and resiliently opposing inward longitudinal movement of said primary shank out of its normal position, friction mechanism interconnecting the inner end of said primary shank and the outer end of said secondary shank, said friction mechanism including frictionally engaging elements opposing inward longitudinal movement of said primary shank out of its normal position, said lost-motion mechanism being arranged to accommodate no substantial outward longitudinal movement of said primary shank out of its normal position and to accommodate said limited inward longitudinal movement of said primary shank out of its normal position, whereby a draft force applied to said coupling head is transmitted from said primary shank to said secondary shank by said lost-motion mechanism and independently of both said cushion mechanism and said friction mechanism, whereby a buff force applied to said coupling head is transmitted from said primary shank to said secondary shank jointly by said cushion mechanism and by said friction mechanism acting in parallel relation with each other and independently of said lost-motion mechanism, and a connector carried by the inner end of said secondary shank and adapted to be connected to cooperating conventional draft gear, said friction mechanism and said cushion mechanism being respectively disposed in two adjacent spaced-apart positions, one of said positions being arranged substantially along the longitudinal center lines of said aligned shanks.

7. The railway car coupler set forth in claim 6, wherein it is said friction mechanism that is disposed in said one position arranged substantially along the longitudinal center lines of said aligned shanks.

8. The railway car coupler set forth in claim 7, wherein said cushion mechanism includes a ring of elastomeric material and is disposed in surrounding relation with said friction mechanism.

9. A railway car coupler comprising a coupling head adapted to receive the usual draft and buff forces, a primary shank connected at the outer end thereof to said coupling head, a secondary shank arranged inwardly of

and in substantial longitudinal alignment with said primary shank, lost-motion mechanism interconnecting said shanks and mounting the same for limited relative longitudinal movements and establishing a normal position for said primary shank with respect to said secondary shank, cushion mechanism interconnecting said shanks and biasing said primary shank into its normal position and resiliently opposing inward longitudinal movement of said primary shank out of its normal position, a longitudinally extending wedge carried by one of said shanks, a pair of longitudinally extending and laterally spaced-apart friction shoes carried by the other of said shanks and cooperating with said wedge, said friction shoes being respectively positioned on opposite sides of said wedge and respectively engaging the adjacent sides thereof, means including a pair of resilient units carried by said other shank and respectively compresses between said friction shoes and said other shanks for resiliently urging said friction shoes into frictional engagements with the respectively adjacent sides of said wedge, said wedge being so tapered that inward longitudinal movement of said primary shank out of its normal position forces said friction shoes laterally away from each other correspondingly to increase the compression of said resilient units, so as to cause said resilient unit correspondingly to increase the compression of said resilient units, so as to cause said resilient units correspondingly to increase the frictional engagements of said friction shoes with the respectively adjacent sides of said wedge, whereby the cooperation between said wedge and said friction shoes effects frictional opposition to inward longitudinal movement of said primary shank out of its normal position and produces frictional dissipation of some of the kinetic energy of such longitudinal movement of said primary shank, said lost-motion mechanism being arranged to accommodate no substantial outward longitudinal movement of said primary shank out of its normal position and to accommodate said limited inward longitudinal movement of said primary shank out of its normal position, whereby a draft force applied to said coupling head is transmitted from said primary shank to said secondary shank by said lost-motion mechanism and independently of both said cushion mechanism and said wedge-friction shoes, whereby a buff force applied to said coupling head is transmitted from said primary shank to said secondary shank jointly by said cushion mechanism and by said wedge-friction shoes acting in parallel relation with each other and independently of said lost-motion mechanism, and a connector carried by the inner end of said secondary shank and adapted to be connected to cooperating conventional draft gear.

10. The railway car coupler set forth in claim 9, wherein each of said resilient units essentially comprises a stack of leaf springs.

11. The railway car coupler set forth in claim 9, wherein each of said resilient units essentially comprises a block of elastomeric material.

12. A railway car coupler comprising a coupling head adapted to receive the usual draft and buff forces, a primary shank connected at the outer end thereof to said coupling head, a secondary shank arranged inwardly of and in substantial longitudinal alignment with said primary shank, wherein the inner end of said primary shank and the outer end of said secondary shank are disposed in adjacent cooperating relation, a substantially centrally disposed and longitudinally extending wedge carried by one of said cooperating shank ends, a first longitudinally extending structure carried by the other of said cooperating shank ends and disposed in embracing and spaced-apart relation with said wedge, a second longitudinally extending structure carried by said one cooperating shank end and disposed in embracing and spaced-apart relation with said first structure, lost-motion mechanism interconnecting said structures and mounting the same for limited relative longitudinal movements there-

between and establishing a normal position for said primary shank with respect to said secondary shank, cushion mechanism arranged between said structures and interconnecting the same and biasing said primary shank into its normal position and resiliently opposing inward longitudinal movement of said primary shank out of its normal position, a pair of longitudinally extending and laterally spaced-apart friction shoes arranged in said first structure, said friction shoes respectively engaging a pair of opposed and laterally spaced-apart friction surfaces provided on said wedge, means including a pair of resilient units arranged in said first structure and respectively compressed between said friction shoes and said first structure for resiliently urging said friction shoes into frictional engagements with the respectively adjacent friction surfaces on said wedge, the opposed friction surfaces on said wedge being so tapered that inward longitudinal movement of said primary shanks out of its normal position forces said friction shoes laterally away from each other, correspondingly to increase the compression of said resilient units, so as to cause said resilient units correspondingly to increase the frictional engagements of said friction shoes with the respectively adjacent friction surfaces on said wedge, whereby the cooperation between said wedge and said friction shoes effects frictional opposition to inward longitudinal movement of said primary shank out of its normal position and produces frictional dissipation of some of the kinetic energy of such longitudinal movement of said primary shank and causes the transmission of an inward longitudinal thrust from said primary shank to said secondary shank via said wedge and said friction shoes and said resilient elements and said first structure, said lost-motion mechanism being arranged to accommodate no substantial outward longitudinal movement of said primary shank out of its normal position and to accommodate said limited inward longitudinal movement of said primary shank out of its normal position, whereby a draft force applied to said coupling head is transmitted from said primary shank to said secondary shank by said lost-motion mechanism and independently of both said cushion mechanism and said wedge-friction shoes; whereby a buff force applied to said coupling head is transmitted from said primary shank to said secondary shank jointly by said cushion mechanism and by said wedge-friction shoes acting in parallel relation with each other and independently of said lost-motion mechanism, and a connector carried by the inner end of said secondary shank and adapted to be connected to cooperating conventional draft gear.

13. The railway car coupler set forth in claim 12, wherein the friction surfaces provided on said wedge are respectively arranged on the opposite sides thereof and are respectively positioned in a pair of upstanding and longitudinally converging planes, said friction shoes are arranged on the respective opposite outer sides of said wedge, said resilient units are arranged on the respective opposite outer sides of said friction shoes, and said connector essentially comprises a strap section carried by the inner end of said secondary shank and extending about an upstanding opening therein that is adapted to receive an upstanding pivot pin to connect the inner end of said secondary shank and cooperating conventional draft gear.

14. The railway car coupler set forth in claim 12, wherein said lost-motion connection essentially comprises a pair of opposed and laterally spaced-apart and aligned pins carried by said wedge and respectively projecting through a pair of cooperating slots provided in said first structure and respectively terminating in a pair of cooperating holes provided in said second structure, said slots being disposed in lateral alignment with each other and extending longitudinally, whereby the cooperation between said pins and said slots accommodates limited longitudinal movement of said structures and consequently

said limited inward longitudinal movement of said primary shank out of its normal position.

15. A railway car coupler comprising a coupling head adapted to receive the usual draft and buff forces, a primary shank connected at the outer end thereof to said coupling head, a secondary shank arranged inwardly of and in substantial longitudinal alignment with said primary shank, wherein the inner end of said primary shank and the outer end of said secondary shank are disposed in adjacent cooperating relation, a substantially centrally disposed and longitudinally extending wedge carried by the outer end of said secondary shank, a first longitudinally extending structure carried by the inner end of said primary shank and disposed in embracing and spaced-apart relation with said wedge, a second longitudinally extending structure carried by the outer end of said secondary shank and disposed in embracing and spaced-apart relation with said first structure, lost-motion mechanism interconnecting said structures and mounting the same for limited relative longitudinal movements therebetween and establishing a normal position for said primary shank with respect to said secondary shank, cushion mechanism arranged between said structures and interconnecting the same and biasing said primary shank into its normal position and resiliently opposing inward longitudinal movement of said primary shank out of its normal position, a pair of longitudinally extending and laterally spaced-apart friction shoes arranged in said first structure, said friction shoes respectively engaging a pair of opposed and laterally spaced-apart friction surfaces provided on said wedge, means including a pair of resilient units arranged in said first structure and respectively compressed between said friction shoes and said first structure for resiliently urging said friction shoes into frictional engagements with the respectively adjacent friction surfaces on said wedge, the opposed friction surfaces on said wedge being so tapered that inward longitudinal movement of said primary shank out of its normal position forces said friction shoes laterally away from each other correspondingly to increase the compression of said resilient units, so as to cause said resilient units correspondingly to increase the frictional engagements of said friction shoes with the respectively adjacent friction surfaces on said wedge, whereby the cooperation between said wedge and said friction shoes effects frictional opposition to inward longitudinal movement of said primary shank out of its normal position and produces frictional dissipation of some of the kinetic energy of such longitudinal movement of said primary shank and causes the transmission of an inward longitudinal thrust from said primary shank to said secondary shank via said wedge and said friction shoes and said resilient elements and said first structure, said lost-motion mechanism being arranged to accommodate no substantial outward longitudinal movement of said primary shank out of its normal position and to accommodate said limited inward longitudinal movement of said primary shank out of its normal position, whereby a draft force applied to said coupling head is transmitted from said primary shank to said secondary shank by said lost-motion mechanism and independently of both said cushion mechanism and said wedge-friction shoes, whereby a buff force applied to said coupling head is transmitted from said primary shank to said secondary shank jointly by said cushion mechanism and by said wedge-friction shoes acting in parallel relation with each other and independently of said lost-motion mechanism, and a connector carried by the inner end of said secondary shank and adapted to be connected to cooperating conventional draft gear.

16. A railway car coupler comprising a coupling head adapted to receive the usual draft and buff force, a primary shank connected at the outer end thereof to said coupling head, a secondary shank arranged inwardly of and in substantial longitudinal alignment with said primary shank, wherein the inner end of said primary shank

and the outer end of said secondary shank are disposed in adjacent cooperating relation, a substantially centrally disposed and longitudinally extending wedge carried by one of said cooperating shank ends, a pair of longitudinally extending and laterally spaced-apart arms carried by said one cooperating shank end and respectively positioned on opposite sides of said wedge and in spaced relation therewith, longitudinally extending structure carried by the other of said cooperating shank ends and disposed in surrounding relation with said wedge and between said wedge and said arms and spaced mutually laterally therefrom, lost-motion mechanism interconnecting said wedge and said structure and mounting the same for limited relative longitudinal movements therebetween and establishing a normal position for said primary shank with respect to said secondary shank, a pair of cushion devices respectively arranged between said arms and said structure and interconnecting the same and biasing said primary shank into its normal position and resiliently opposing inward longitudinal movement of said primary shank out of its normal position, a pair of longitudinally extending and laterally spaced-apart friction shoes arranged in said structure, said friction shoes respectively engaging a pair of opposed and laterally spaced-apart friction surfaces provided on said wedge, means including a pair of resilient units arranged in said structure and respectively compressed between said friction shoes and said structure for resiliently urging said friction shoes into frictional engagements with the respectively adjacent friction surfaces on said wedge, the opposed friction surfaces on said wedge being so tapered that inward longitudinal movement of said primary shank out of its normal position forces said friction shoes laterally away from each other correspondingly to increase the compression of said resilient units, so as to cause said resilient units correspondingly to increase the frictional engagements of said friction shoes with the respectively adjacent friction surfaces of said wedge, whereby the cooperation between said wedge and said friction shoes effects frictional opposition to inward longitudinal movement of said primary shank out of its normal position and produces frictional dissipation of some of the kinetic energy of such longitudinal movement of said primary shank and causes the transmission of an inward longitudinal thrust from said primary shank to said secondary shank via said wedge and said friction shoes and said resilient elements and said first structure, said lost-motion mechanism being arranged to accommodate no substantial outward longitudinal movement of said primary shank out of its normal position and to accommodate said limited inward longitudinal movement of said primary shank out of its normal position, whereby a draft force applied to said coupling head is transmitted from said primary shank to said secondary shank by said lost-motion mechanism and independently of both said cushion mechanism and said wedge-friction shoes, whereby a buff force applied to said coupling head is transmitted from said primary shank to said secondary shank jointly by said cushion mechanism and by said wedge-friction shoes acting in parallel relation with each other and independently of said lost-motion mechanism and a connector carried by the inner end of said secondary shank and adapted to be connected to cooperating conventional draft gear.

17. The railway car coupler set forth in claim 16, wherein said lost-motion mechanism essentially comprises a substantially horizontally disposed pin extending laterally through a slot provided in said wedge and terminating in a pair of cooperating holes provided in said structure, said slot extending longitudinally, whereby the cooperation between said pin and said slot accommodates limited longitudinal movement of said wedge and said structure relative to each other and consequently said limited inward longitudinal movement of said primary shank out of its normal position.

18. A railway car coupler comprising a coupling head

adapted to receive the usual draft and buff forces, a primary shank connected at the outer end thereof to said coupling head, a secondary shank arranged inwardly of and in substantial longitudinal alignment with said primary shank, lost-motion mechanism interconnecting said shanks and mounting the same for limited relative longitudinal movements and establishing a normal position for said primary shank with respect to said secondary shank, cushion mechanism interconnecting said shanks and biasing said primary shank into its normal position and resiliently opposing inward longitudinal movement of said primary shank out of its normal position, friction mechanism interconnecting said shanks and frictionally opposing inward longitudinal movement of said primary shank out of its normal position, said lost-motion mechanism being arranged to accommodate no substantial outward longitudinal movement of said primary shank out of its normal position and to accommodate said limited inward longitudinal movement of said primary shank out of its normal position, whereby a draft force applied to said coupling head is transmitted from said primary shank to said secondary shank by said lost-motion mechanism and independently of both said cushion mechanism and said friction mechanism, whereby a buff force applied to said coupling head may be transmitted from said primary shank to said secondary shank jointly by said cushion mechanism and by said friction mechanism acting in parallel relation with each other and independently of said lost-motion mechanism, locking mechanism cooperating between said shanks and having lock and unlock positions, said locking mechanism in its lock position connecting said shanks, whereby a buff force applied to said coupling head is transmitted from said primary shank to said secondary shank by said locking mechanism in its lock position and independently of said cushion mechanism and said friction mechanism, said locking mechanism in its unlock position disconnecting said shanks, whereby a buff force applied to said coupling head is transmitted from said primary shank to said secondary shank jointly by said cushion mechanism and said friction mechanism and independently of said locking mechanism in its unlock position, and a connector carried by the inner end of said secondary shank and adapted to be connected to cooperating conventional draft gear.

19. A railway car coupler comprising a coupling head adapted to receive the usual draft and buff forces, a primary shank connected at the outer end thereof to said coupling head, a secondary shank arranged inwardly of and in substantial longitudinal alignment with said primary shank, wherein the inner end of said primary shank and the outer end of said secondary shank are disposed in adjacent cooperating relation, a substantially centrally disposed and longitudinally extending wedge carried by one of said cooperating shank ends, a first longitudinally extending structure carried by the other of said cooperating shank ends and disposed in embracing and spaced-apart relation with said wedge, a second longitudinally extending structure carried by said one cooperating shank end and disposed in embracing and spaced-apart relation with said first structure, lost-motion mechanism interconnecting said wedge and said first structure and mounting the same for limited relative longitudinal movements and establishing a normal position for said primary shank with respect to said secondary shank, cushion mechanism arranged between said structures and interconnecting the same and biasing said primary shank into its normal position and resiliently opposing inward longitudinal movement of said primary shank out of its normal position, a pair of longitudinally extending and laterally spaced-apart friction shoes arranged in said first structure, said friction shoes respectively engaging a pair of opposed and laterally spaced-apart friction surfaces provided on said wedge, means including a pair of resilient units arranged in said first structure and respectively compressed between said friction shoes and said first structure for resiliently urging

said friction shoes into frictional engagements with the respectively adjacent friction surfaces on said wedge, the opposed friction surfaces on said wedge being so tapered that inward longitudinal movement of said primary shank out of its normal position forces said friction shoes laterally away from each other correspondingly to increase the compression of said resilient units, so as to cause said resilient units correspondingly to increase the frictional engagements of said friction shoes with the respectively adjacent friction surfaces on said wedge, whereby the cooperation between said wedge and said friction shoes effects frictional opposition to inward longitudinal movement of said primary shank out of its normal position and produces frictional dissipation of some of the kinetic energy of such longitudinal movement of said primary shank and causes the transmission of an inward longitudinal thrust from said primary shank to said secondary shank via said wedge and said friction shoes and said resilient elements and said first structure, said lost-motion mechanism being arranged to accommodate no substantial outward longitudinal movement of said primary shank out of its normal position and to accommodate said limited inward longitudinal movement of said primary shank out of its normal position, whereby a draft force applied to said coupling head is transmitted from said primary shank to said secondary shank by said lost-motion mechanism and independently of both said cushion mechanism and said wedge-friction shoes, whereby a buff force applied to said coupling head is transmitted from said primary shank to said secondary shank jointly by said cushion mechanism and by said wedge-friction shoes acting in parallel relation with each other and independently of said lost-motion mechanism, and a connector carried by the inner end of said secondary shank and adapted to be connected to cooperating conventional draft gear.

20. The railway car coupler set forth in claim 19, wherein each of said resilient units essentially comprises a plurality of longitudinally spaced-apart resilient elements, and each of said resilient elements essentially comprises a stack of leaf springs.

21. The railway car coupler set forth in claim 19, wherein each of said resilient units essentially comprises a stack of slabs of elastomeric material.

22. In a railway car including a center sill having an open end, a striker plate carried by the extreme outer end of said center sill and having an opening therethrough communicating with the adjacent open outer end of said center sill, the outer end portion of said center sill disposed immediately inwardly of said striker plate being hollow and having a draft gear pocket formed therein, and a draft gear disposed in said draft gear pocket and operatively connected to said center sill; the combination of a car coupler comprising a first shank arranged in the outer open end of said center sill and projecting through the opening provided in said striker plate, an operative connection between the rear end of said first shank and said draft gear for transmitting both draft and buff forces from said first shank to said center sill through said draft gear, a second shank cooperating with said first shank and disposed outwardly thereof, a coupling head connected to the outer end of said second shank and adapted to receive the usual draft and buff forces, said shanks being arranged in substantial longitudinal alignment with each other, lost-motion mechanism interconnecting the outer end of said first shank and the inner end of said second shank and mounting said shanks for limited relative longitudinal movements and establishing a normal position for said second shank with respect to said first shank, cushion mechanism interconnecting the outer end of said first shank and the inner end of said second shank and biasing said second shank into its normal position and resiliently opposing inward longitudinal movement of said second shank out of its normal position, and

friction mechanism interconnecting the outer end of said first shank and the inner end of said second shank and frictionally opposing inward longitudinal movement of said second shank out of its normal position, said lost-motion mechanism being arranged to accommodate no substantial outward longitudinal movement of said second shank out of its normal position and to accommodate said limited inward longitudinal movement of said second shank out of its normal position, whereby a draft force applied to said coupling head is transmitted therefrom via said second shank to said first shank by said lost-motion mechanism and independently of both said cushion mechanism and said friction mechanism and thence via said draft gear to said center sill, whereby a buff force applied to said coupling head is transmitted therefrom via said second shank to said first shank jointly by said cushion mechanism and by said friction mechanism acting in parallel relation with each other and independently of said lost-motion mechanism.

23. A railway car coupler comprising a coupling head adapted to receive the usual draft and buff forces, a primary shank connected at the outer end thereof to said coupling head, a secondary shank arranged inwardly of and in substantial longitudinal alignment with said primary shank, lost-motion mechanism interconnecting said shanks and mounting the same for limited relative longitudinal movements and establishing a normal position for said primary shank with respect to said secondary shank, first motion-controlling mechanism interconnecting said shanks and biasing said primary shank into its normal position and resiliently opposing inward longitudinal movement of said primary shank out of its normal position, said first motion-controlling mechanism including an elastic member that is strained by inward longitudinal movement of said primary shank out of its normal position, second motion-controlling mechanism interconnecting said shanks and frictionally opposing inward longitudinal movement of said primary shank out of its normal position, said second motion-controlling mechanism including structure carried by one of said shanks and defining a chamber and a piston carried by the other of said shanks and arranged in said chamber and a body of hydraulic fluid arranged in said chamber and cooperating with said piston and a flow-restricting device cooperating with the hydraulic fluid in said chamber, whereby inward longitudinal movement of said primary shank out of its normal position causes said piston to pump the hydraulic fluid in said chamber through said flow-restricting device so as frictionally to oppose such movement of said primary shank out of its normal position, said lost-motion mechanism being arranged to accommodate no substantial outward longitudinal movement of said primary shank out of its normal position and to accommodate said limited inward longitudinal movement of said primary shank out of its normal position, whereby a draft force applied to said coupling head is transmitted from said primary shank to said secondary shank by said lost-motion mechanism and independently of both said first and second motion-controlling mechanisms, whereby a buff force applied to said coupling head is transmitted from said primary shank to said secondary shank by said first and second motion-controlling mechanisms acting in parallel relation with each other and independently of said lost-motion mechanism, and a connector carried by the inner end of said secondary shank and adapted to be connected to cooperating conventional draft gear.

References Cited by the Examiner

UNITED STATES PATENTS

1,733,527	10/1929	Cotton	213—26
3,176,857	4/1965	Clejan	213—22

ARTHUR L. LA POINT, *Primary Examiner*.