Dec. 19, 1933. D. S. BARROWS 1,939,652

CUSHIONING MECHANISM

Filed Jan. 7, 1931 2 Sheets-Sheet 1

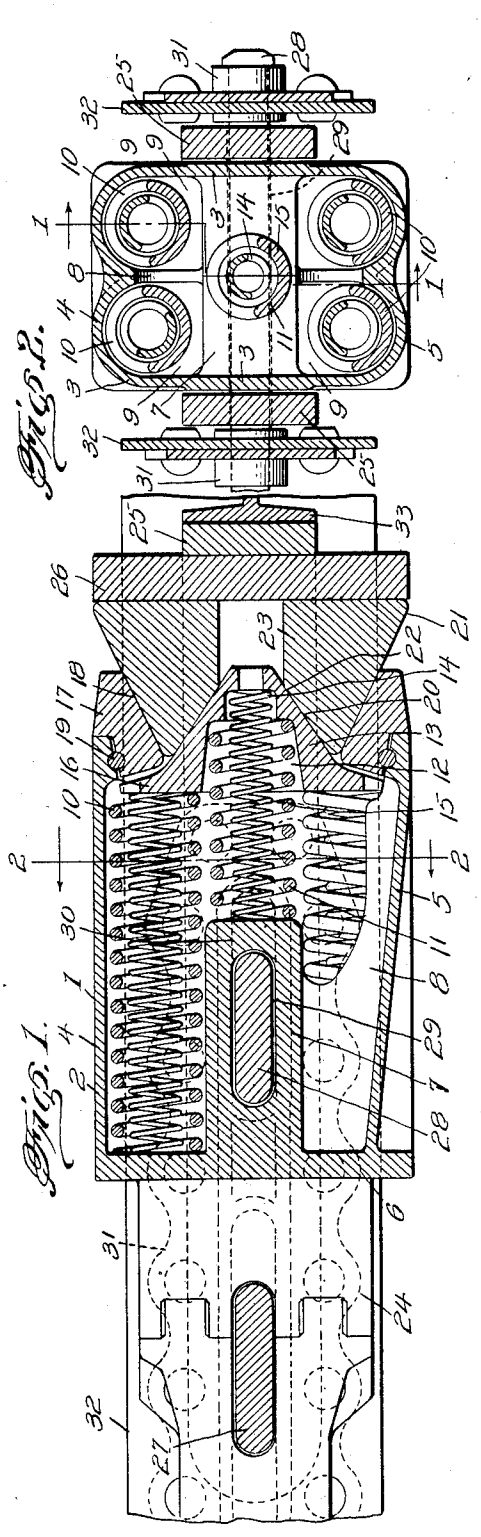


Fig. 1.

Fig. 2.

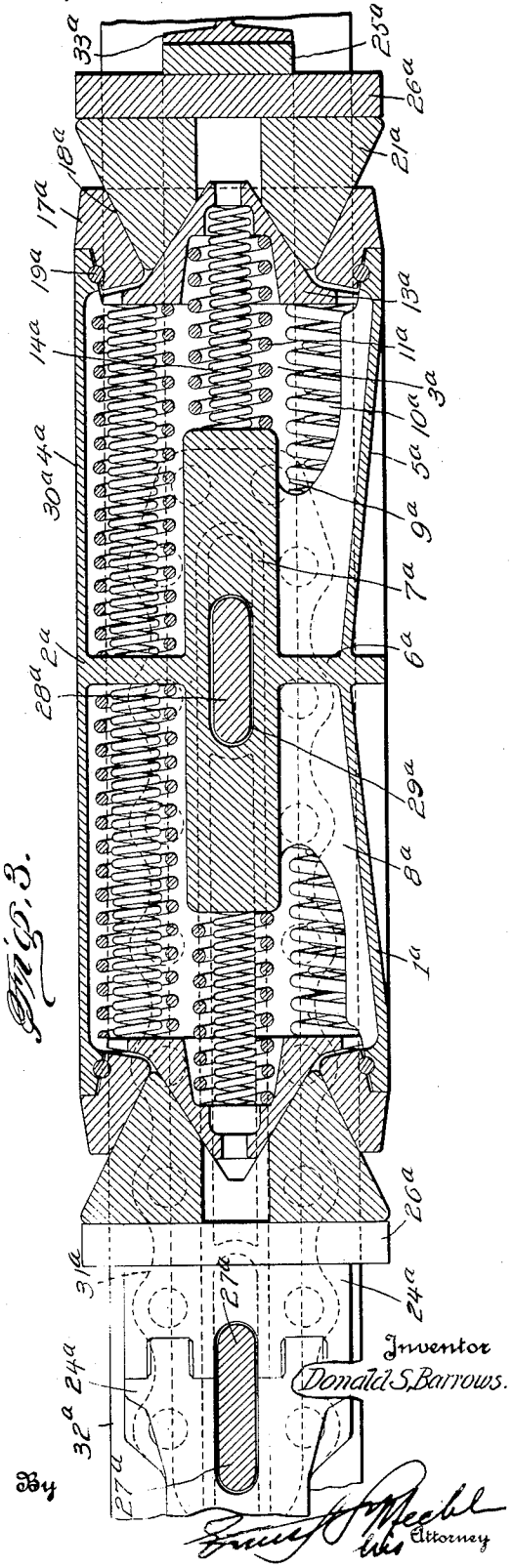


Fig. 3.

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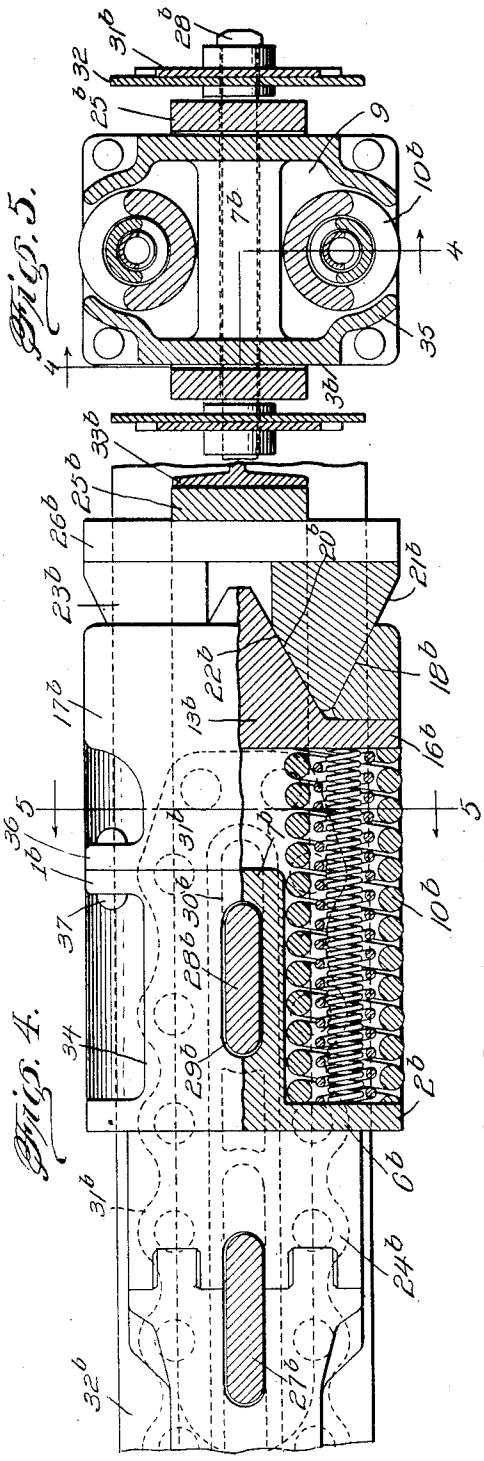


Fig. 4.

Fig. 5.

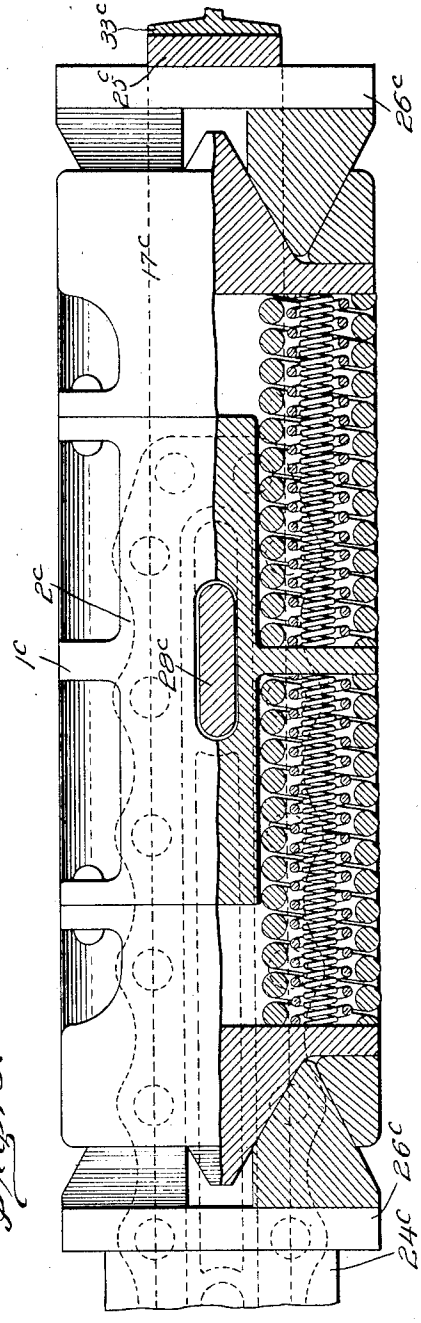


Fig. 6.

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UNITED STATES PATENT OFFICE

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CUSHIONING MECHANISM

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6 Claims. (Cl. 213—22)

This invention relates to friction shock absorbing mechanism and its arrangement with railway draft rigging so that a portion of the housing functions as the ordinary front follower without increasing the length thereof, whereby said housing is adapted to be stopped against forward movement without the use of front draft lugs.

The principal object of my invention, generally considered, is to provide single- and double-ended cushioning mechanism, a portion of which is slotted to receive a connecting horizontal draft key, and, if double-ended, the parts of which are adapted to operate in series in association with the sills of railway rolling stock, so that the mechanism will function to provide greater energy absorbing capacity under buff than under draft.

Another object of my invention is the provision of cushioning mechanism involving a housing with longitudinally extending walls connected by a transversely extending wall, with a normally horizontal partition connecting the side walls and slotted for receiving a connecting draft key, an end, or the ends, of said housing being open, with friction boxes connected thereto, or provided with inwardly converging friction surfaces, an intermediate follower, or followers, with outwardly converging friction surfaces, being received in said housing, and wedge blocks engaging the inclined surfaces on the housing and follower, or followers, with release springs acting between the follower, or followers, and the transverse wall, the assembled parts being normally embraced by a yoke and limited in rearward movement by a backstop, or other rearward limiting means, and the yoke being normally connected to an associated coupler by a draft key, or the like.

Other objects and advantages of the invention relating to the particular arrangement and construction of the various parts will become apparent as the description proceeds.

Referring to the drawings illustrating my invention, the scope whereof is defined by the appended claims:—

Figure 1 is a longitudinal vertical sectional view of one form of my cushioning mechanism, shown on the line 1—1 of Fig. 2, looking in the direction of the arrows, assembled with associated draft rigging, portions of the associated backstop, coupler and cheek plates being illustrated.

Figure 2 is a transverse sectional view on the line 2—2 of Fig. 1, looking in the direction of the arrows.

Figure 3 is a view corresponding to Fig. 1, but showing cushioning mechanism of the double-ended type.

Figure 4 is a view corresponding to Fig. 1, but showing a modification, and illustrating the cushioning mechanism partially in side elevation.

Figure 5 is a transverse sectional view on the line 5—5 of Fig. 4, looking in the direction of the arrows.

Figure 6 is a view corresponding to Fig. 4, but showing mechanism of the double-ended type.

Referring to the drawings in detail, like parts being designated by like reference characters, and first considering the embodiment of my invention illustrated in Figs. 1 and 2, there is shown one embodiment of my cushioning mechanism or draft gear 1 comprising a housing or casing 2 with normally vertical side walls 3 connected by preferably inclined and transversely curved top and bottom walls 4 and 5, and a transverse wall 6, said transverse wall, in the present embodiment, being the front end wall from which extends a normally horizontal partition 7.

The partition 7, and a normally vertical partition 8 merging with the partition 7 and the upper and lower walls 4 and 5, divides the housing into four compartments 9 which normally receive the four nests or units of release springs 10. A fifth nest or unit 11 of release springs desirably engages the rear face of the partition 7 with its free end received in an inwardly opening pocket 12 in the intermediate follower 13, said pocket being desirably formed so that the inner coil 14 of the nest of springs 11 may extend further than the outer coil 15. The follower 13 desirably has outwardly extending stop shoulders 16, adapted to engage the friction box or portions 17 of the housing, on which are provided the inclined friction surfaces 18, to limit movement thereof outwardly of the housing. The friction box 17 may be connected to the housing in any desired manner, as by rivets or other connecting means 19.

The intermediate follower 13 is provided with outwardly converging friction surfaces 20, said surfaces 18 and 20 being normally engaged by corresponding surfaces 21 and 22 on the associated wedge blocks 23.

In utilizing the shock absorbing mechanism disclosed, an associated coupler 24 desirably abuts the wall 6 of the housing and is connected to a yoke 25 which embraces the rear follower 26 and the associated mechanism 1, and is connected to the coupler as by means of a horizontal key 27. The side arms of the yoke 25 are desirably slotted to receive a second key 28 which

extends through a corresponding slot 29 in the horizontal partition 7 and has its ends received in corresponding slots 30 in associated cheek plates 31 and sills 32. The slots 30 in the cheek plates are desirably elongated rearwardly of the normal position of the key 28 so as to permit rearward movement of the housing 2, so that it slides over the wedges 21 and effects compression of the mechanism, it being understood that the release springs 10 and 11 are compressed differentially, as compared with the movement of the blocks 21 into the housing, because of the engagement between the inclined friction surfaces on the housing or friction box thereof, and the corresponding inclined surfaces of the wedge blocks 21, so that a relatively great spring capacity, as well as frictional cushioning effect, is provided by the arrangement disclosed. The slots 30 in the cheek plates are desirably disposed with their forward ends terminating at the normal forward position of the front edge of the key 28, so that said key serves as a front stop for limiting forward movement of the housing and associated mechanism. The rearward movement of the yoke 25 and associated rear follower 26 may be limited by any desired means, such as an associated backstop 33.

Referring now to the embodiment of my invention illustrated in Figure 3, a cushioning mechanism 1^a is there disclosed which involves a housing or mechanism casing 2^a open at both ends, rather than closed at one end, as in the previous embodiment. Each end of the housing 2^a has a friction box 17^a, or is provided with inclined friction surfaces 18^a, said friction surfaces being normally engaged by corresponding surfaces on wedge blocks 21^a, as in the previous embodiment. A normally vertical transverse wall or partition 6^a connects the side walls 3^a and top and bottom walls 4^a and 5^a, as in the previous embodiment, said wall, however, being preferably centrally disposed rather than adjacent one end of the housing. A normally horizontal partition 7^a and a vertical partition 8^a are provided, as in the previous embodiment, forming compartments 9^a for the release springs 10^a. As in the previous embodiment the top and bottom walls are preferably curved to partially embrace the release springs and guide them during their compressive and expansive movements. The partition 7^a is slotted, as indicated at 29^a, to receive a connecting draft key 28^a, as in the previous embodiment, and the release springs engage the wall 6^a, partition 7^a and intermediate followers 13^a, as in the previous embodiment.

One way of utilizing the double-ended mechanism here disclosed is to connect it to an associated coupler 24^a which, in the present embodiment, is illustrated as being a swivel butt coupler, although I do not wish to be limited to this showing, and to provide a horizontal yoke 25^a surrounding the mechanism 1^a and associated followers 25^a with the looped or rear end disposed between the rear follower and an associated backstop 33^a, or other means for limiting rearward movement of the mechanism, and connecting said yoke and coupler by a front draft key 27^a, or other means for harnessing the parts together. The yoke 25 has its side arms slotted for receiving the key 28^a which connects the mechanism to the associated cheek plates 31^a and draft sills 32^a, the slots in said cheek plates, as in the previous embodiment, being preferably extended rearwardly to permit the housing 2^a to move rearwardly under the action of buffing forces for the compression of the mechanism in both ends of the housing, while preventing forward movement of the housing, whereby only the mechanism in the rear end thereof is stressed under the action of draft forces.

From the foregoing description, it will be seen that under the action of draft forces, the housing 2^a is held stationary by the key 28^a when the coupler 24^a pulls the yoke 25^a forwardly through the connecting key 27^a, moving the rear follower 25^a and pushing the rear friction blocks 21^a and intermediate follower 13^a to compress the release springs 10^a and 11^a, thereby actuating only the rear cushioning mechanism or rear half of the double-ended gear 1^a, utilizing only one-half the total capacity of said gear which, at the same time, permits only one half the movement permitted under a full compression of the gear.

Under the action of buffing forces, however, the butt of the coupler 24^a engages the front wedges 21^a, pushing them over the inclined surfaces on the friction blocks and intermediate follower and compressing the associated release springs, while simultaneously moving the housing 2^a rearwardly so that the rear friction elements are similarly actuated and the associated rear release springs compressed, so that a full compression of the gear is permitted. On account of this action under buff not only is increased energy absorbing capacity provided, but a coupler travel equal to the sum of the travels permitted by the friction elements at each end of the gear is permitted. Although for convenience and economy of manufacture, the gear is desirably made symmetrical, so that the travel and capacity provided at each end is substantially identical, yet this is not essential, in accordance with the broad aspect of my invention, so that the capacities and travels of the two ends of the gear may be equal or different, as desired.

Referring now to the embodiment of my invention illustrated in Figures 4 and 5, there is shown a friction draft gear somewhat like that of Figures 1 and 2, except that only two nests of release springs 10^b are employed instead of five, and the housing 2^b of the mechanism 1^b comprises a release spring receiving portion 34 and a friction box portion 17^b. As in the previous embodiment, the housing 2^b has side walls 3^b, but the top and bottom walls are omitted, the side walls curving around the release springs, as indicated at 35, and spaced above and below said springs. By curving the portions 35 and disposing them inwardly of the main side wall portion 3^b, abutting flanges 36 are provided receiving the connecting rivets 37 for holding the parts 34 and 17^b of the housing together.

As in the previous embodiment, the side walls 3^b are connected by a transverse wall 6^b which, in the present embodiment, is a front end wall, and from said wall extends a normally horizontal partition 7^b, the partition 7^b dividing the housing into two compartments 9^b which normally receive the two nests or units of release springs 10^b. The release springs engage the transverse wall 6^b at the front end of the gear. an intermediate follower 13^b being desirably provided with outwardly extending stop shoulders or flanges 16^b adapted to engage stop shoulders provided on the friction box 17^b at the inner ends of the inclined friction surfaces 18^b. The intermediate follower 13^b is provided with outwardly converging friction surfaces 20^b, said surfaces 18^b and 20^b being normally engaged by corre-

sponding surfaces 21^b and 22^b on the associated wedge blocks 23^b.

The shock absorbing mechanism before described may be utilized with an associated coupler 24^b by placing it with the front wall 6^b in abutting engagement with said coupler, and embraced by an associated yoke 25^b, said yoke being connected to the coupler as by means of a horizontal key 27^b. The side arms of the yoke are desirably slotted to receive a second key 28^b which extends through a corresponding slot 29^b in the horizontal partition 7^b and has its ends received in corresponding slots 30^b in associated cheek plates 31^b. The slots 30^b in the cheek plates are desirably elongated rearwardly of the normal position of the key 28^b so as to permit rearward movement of the housing 2^b, as in the previous embodiment. The rearward movement of the yoke 25^b and associated rear follower 26^b may be limited by any desired means, such as an associated backstop 33^b.

Referring now to the embodiment of my invention illustrated in Figure 6, a cushioning mechanism 1^c is there disclosed which involves a housing 2^c comprising a release spring receiving portion 34^c and two friction box or end portions 17^c, the housing or mechanism casing 2^c being open at both ends, rather than closed at one end, as in the previous embodiment. It will be seen that the double-ended gear 1^c here disclosed compares with the single-ended gear of Figures 4 and 5, exactly as the double-ended gear of Figure 3 compares with the single-ended gear of Figures 1 and 2, so that a detailed description thereof need not be given.

One way of utilizing the double-ended mechanism 1^c is to connect it to an associated coupler 24^c, and to provide a horizontal yoke 25^c surrounding the mechanism 1^c and an associated rear follower 26^c with the looped or rear end disposed between said follower and an associated backstop 33^c, or other means for limiting rearward movement of the mechanism, and connecting said yoke and coupler by a front draft key, as in the previous embodiment. The yoke 25^c has its side arms slotted for receiving the key 28^c which connects the mechanism to the associated cheek plates 31^c which, of course, are attached to the draft sills of the car, the slots in said cheek plates, as in the previous embodiment, being preferably extended rearwardly to permit the housing 2^c to move rearwardly under the action of buffing forces for the compression of the mechanism in both ends of the housing, while preventing forward movement of the housing, whereby only the mechanism in the rear end thereof is stressed under the action of draft forces, and the entire mechanism is compressed under the action of buffing forces, like the double-ended mechanism shown in Figure 3, as will be understood.

From the foregoing description, taken in connection with the accompanying drawings, it will be apparent that I have devised forms of cushioning mechanism, both single-ended and double-ended, with the parts in each end of the double-ended mechanism adapted to be actuated in series under the action of buffing forces, while the parts at one end only are preferably actuated under the action of draft forces. It will also be clear that I have devised a mechanism in which lighter release springs may be employed because of the differential compression of said springs, that is, by providing an arrangement whereby the springs are compressed a greater amount than the intermediate followers are moved.

Although I have illustrated preferred embodiments of my invention, it will be understood that I do not wish to be limited to the exact form shown, as modifications may be made within the spirit and scope of the appended claims.

I claim:—

1. In a railway draft rigging, in combination with slotted sills providing a freely open draft gear pocket, a cushioning mechanism housing comprising walls connected by a transversely extending central partition, side walls connected by a normally horizontal partition, top and bottom walls connected by a normally vertical partition, said side walls and partitions being slotted to receive a horizontal draft key adapted to pass through the slots in said sills and hold the housing against forward movement, the ends of said housing being open, friction boxes connected to said open ends and providing inwardly converging friction surfaces, intermediate followers with inwardly opening pockets and outwardly converging friction surfaces, wedge blocks engaging the inclined surfaces of the housing and intermediate followers, release springs disposed in the pockets between the walls and horizontal and vertical partitions, between said transverse partition and intermediate followers, release springs between the ends of the horizontal partition and intermediate followers, with their ends received in the follower pockets, means limiting rearward movement of said mechanism, a coupler engaging the forward portion of said mechanism, a yoke surrounding said mechanism with the loop portion disposed between it and said rearward limiting means, and means for connecting said coupler and yoke.

2. In railway draft rigging, in combination with slotted sills providing a freely open draft gear pocket, a cushioning mechanism housing comprising walls connected by a transverse wall, side walls connected by a normally horizontal partition, top and bottom walls connected by a normally vertical partition extending upwardly and downwardly from said horizontal partition, said side walls and partitions being slotted to receive a horizontal draft key adapted to pass through the corresponding slots in said sills and hold the housing against forward movement, an end of said housing being open, a friction box connected to said open end and providing inwardly converging friction surfaces, an intermediate follower with an inwardly opening pocket and outwardly converging friction surfaces, wedge blocks engaging the inclined surfaces of the housing and intermediate follower, release springs disposed, in the pockets between the walls and horizontal and vertical partitions, between said transverse wall and intermediate follower, release springs between the end of said horizontal partition and intermediate follower with their ends received in the follower pocket, means limiting rearward movement of said mechanism, a coupler engaging the forward portion of said mechanism, a yoke surrounding said mechanism with the loop portion disposed between it and said rearward limiting means, and means for connecting said coupler and yoke.

3. Cushioning mechanism comprising a housing with walls connected by a transversely extending partition, side walls connected by a normally horizontal partition, said side walls and partitions being slotted to receive a horizontal draft key for connecting said mechanism to associated draft sills, the ends of said housing being open and provided with inwardly converging friction surfaces,

intermediate followers with outwardly converging friction surfaces and inwardly opening pockets, wedge blocks engaging the inclined surfaces on the housing and intermediate followers, and release springs disposed between the transverse partition and with outer portions thereof received in the pockets in said intermediate followers.

4. Cushioning mechanism comprising a housing with walls connected by a normally transverse wall, side walls connected by a horizontal partition, said side walls and partition being slotted to receive a horizontal draft key adapted to pass through corresponding slots in associated sills and hold the housing against forward movement, an end of said housing being open, a friction box connected to said open end and providing inwardly converging friction surfaces, an intermediate follower with an inwardly opening pocket and outwardly converging friction surfaces, wedge blocks engaging the inclined surfaces of the housing and intermediate follower, release springs disposed between said transverse wall and intermediate follower, and release springs between the end of said horizontal partition and intermediate follower with their ends received in the follower pocket.

5. Cushioning mechanism comprising a housing with a release spring receiving portion and an end friction portion connected together, said release spring portion comprising a transversely extending wall, side walls connected by a normally horizontal partition, said side walls and partition being slotted to receive a horizontal draft key adapted to pass through the slots in associated sills and hold the housing against forward movement, the friction portion of said housing being open and providing inwardly converging friction surfaces, an intermediate follower normally limited in outward movement by those portions of said friction portion providing the friction surfaces and formed with outwardly converging friction surfaces and an inwardly opening pocket, wedge blocks engaging the friction portion of the housing and intermediate follower, and release spring means disposed between said transverse partition and with the outer end received in the pocket of the intermediate follower.

6. Cushioning mechanism comprising a housing with two pairs of side walls, one pair of side walls being connected by a partition extending generally parallel to the other pair of side walls, one end of said housing being provided with outwardly diverging friction surfaces, an intermediate follower with an inwardly opening pocket and outwardly converging friction surfaces, wedge blocks engaging the friction surfaces on the housing and intermediate follower, and release spring means normally engaging the outer end portion of said partition and with portions received in the follower pocket.

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