Feb. 28, 1939. E. H. BLATTNER 2,149,203

CUSHIONING MECHANISM

Filed Jan. 3, 1935 2 Sheets-Sheet 1

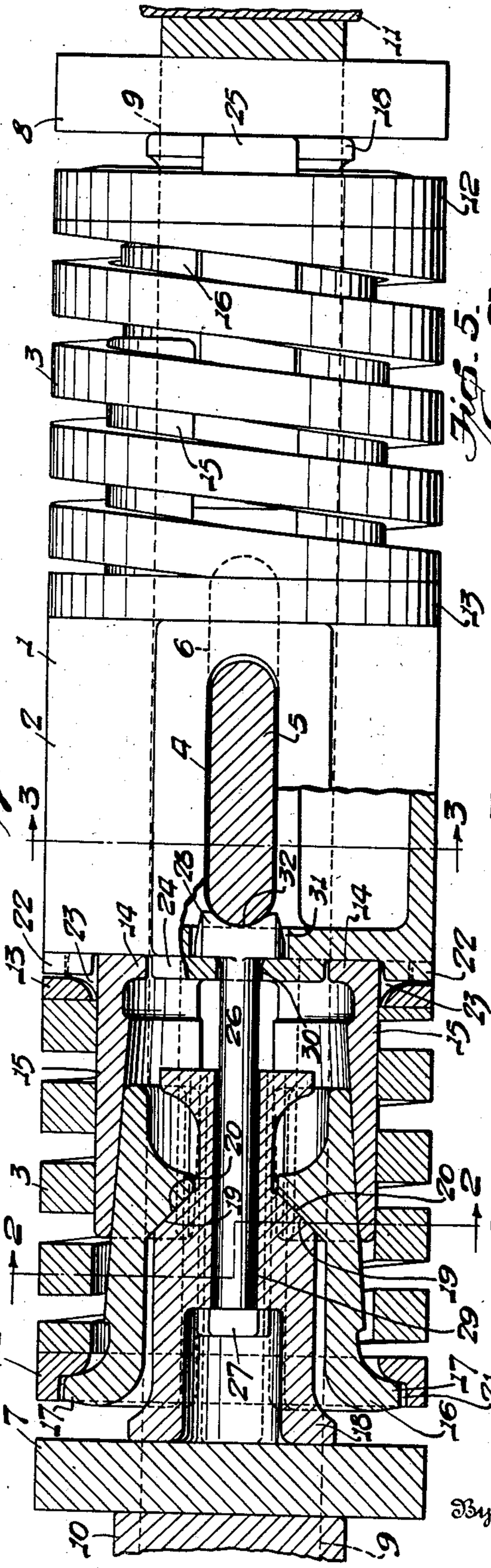

Fig. 1.

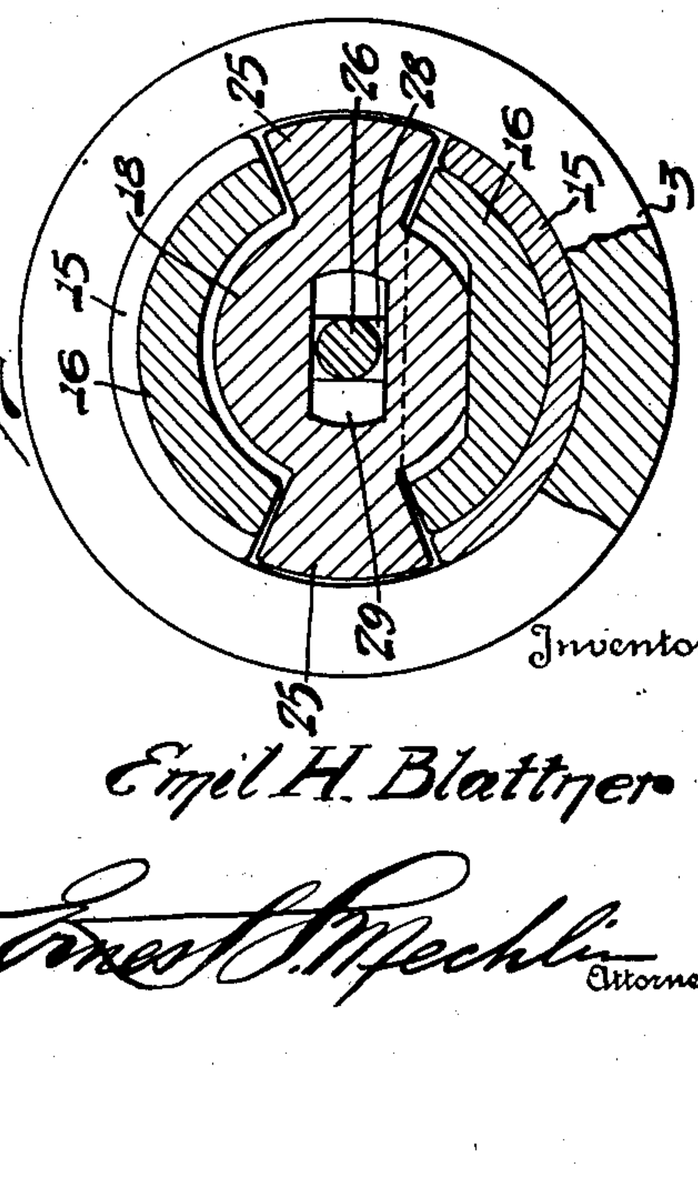

Fig. 2.

Fig. 3.

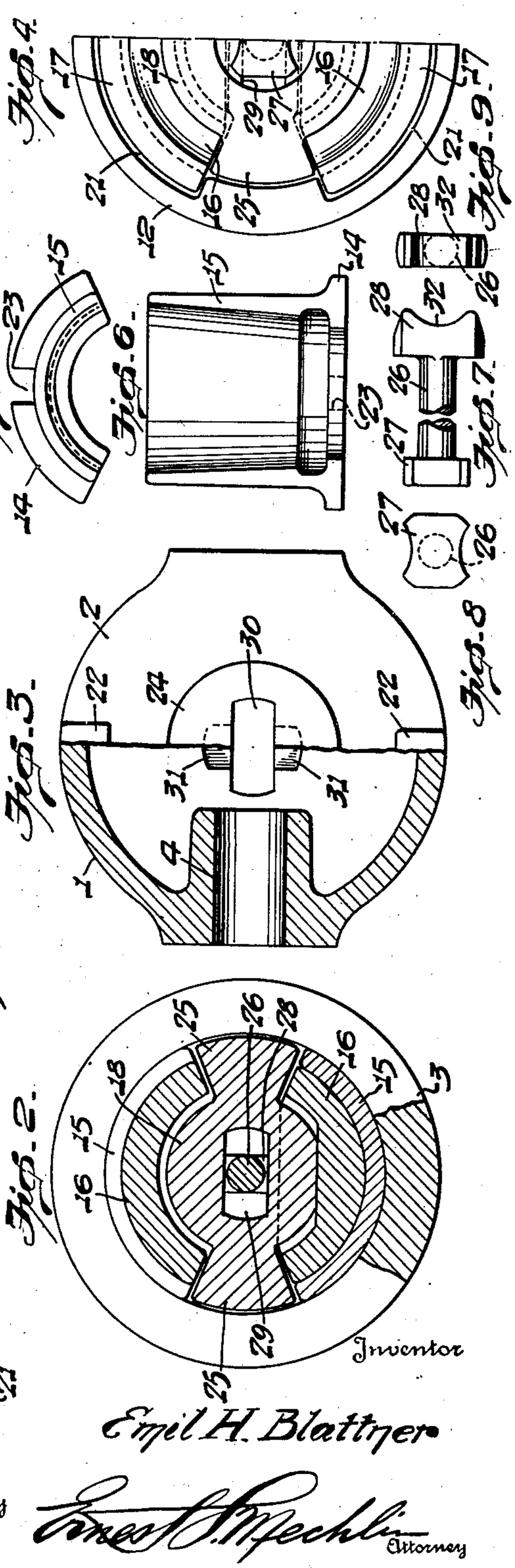

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

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CUSHIONING MECHANISM

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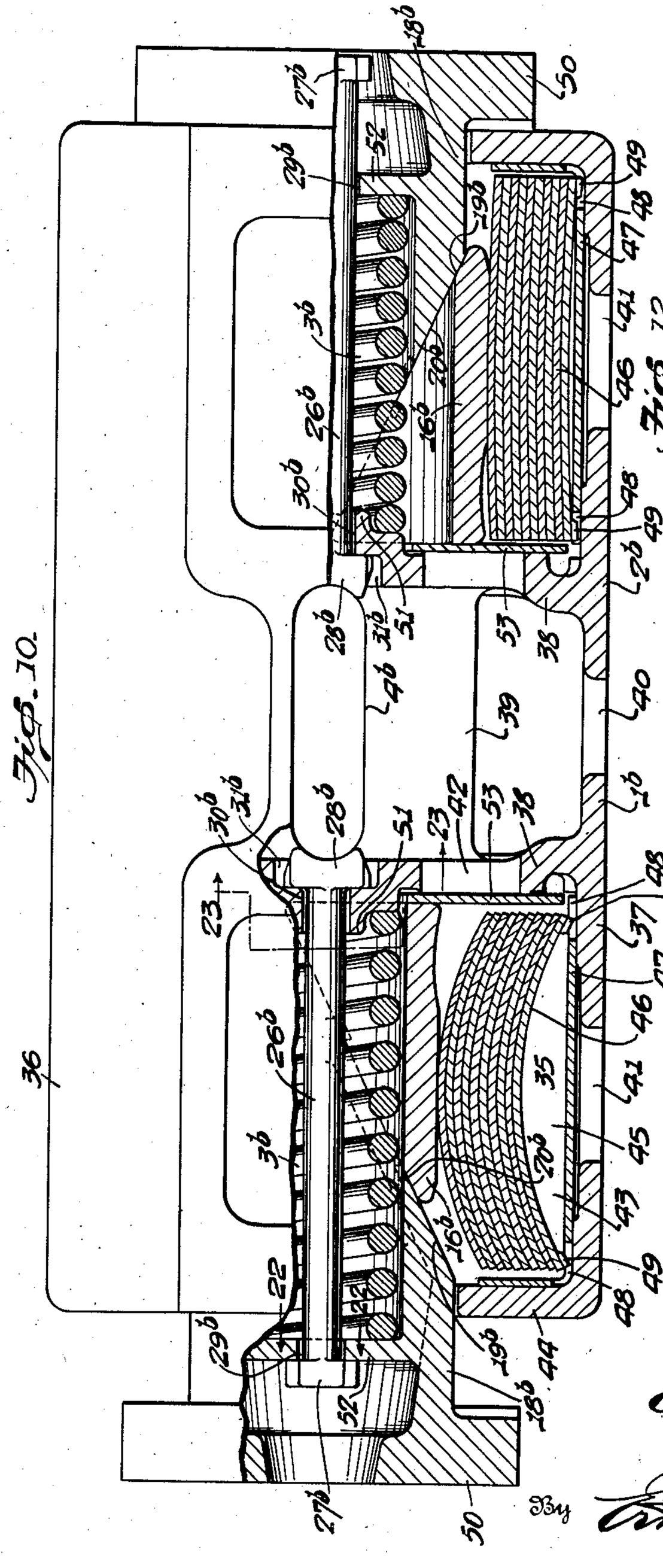

Fig. 10.

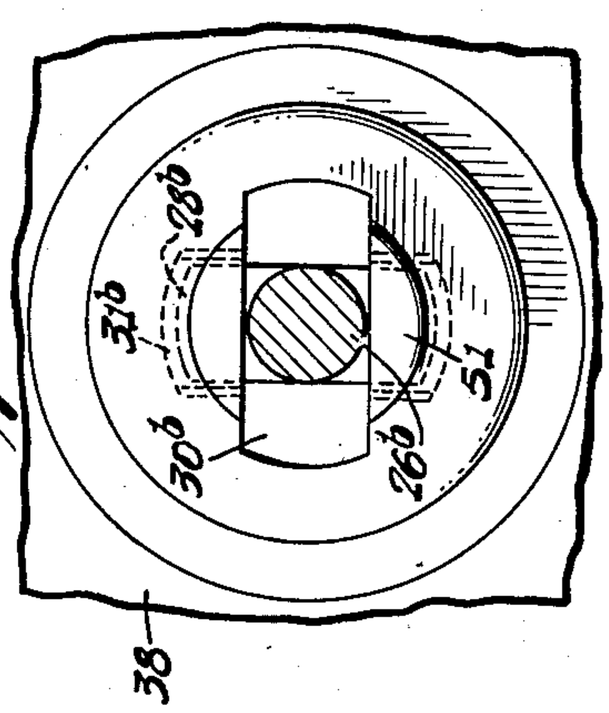

Fig. 12.

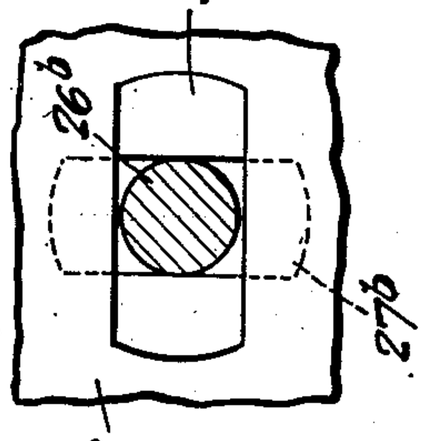

Fig. 11.

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Patented Feb. 28, 1939 2,149,203

UNITED STATES PATENT OFFICE

2,149,203

CUSHIONING MECHANISM

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Application January 3, 1935, Serial No. 281

16 Claims. (Cl. 213—22)

This invention relates to railway draft rigging and, more particularly, to cushioning mechanism associated therewith and allowing for a greater travel of the coupler under buff than under draft, with the coupler movement being resisted by a greater shock absorbing capacity than is interposed against draft movement.

The principal object of my invention, generally considered, is the provision of a double end draft gear or cushioning mechanism adapted for series application to provide a greater buffing than draft energy absorbing capacity, with the body portion thereof slotted for receiving a draft key for connection with associated sills.

Another object of my invention is to provide shock absorbing mechanism comprising a body casting and a cushioning unit at each end thereof, each unit comprising friction shoes, associated resilient means, and a central wedge member for urging the friction shoes together, the elements of each cushioning unit being held assembled by a longitudinally extending bolt, with a head at each end, which bolt is adapted for being locked in place by turning 90° about its axis after insertion.

A still further object of my invention is the provision of cushioning mechanism comprising a slotted body portion spacing helical spring barrels disposed at the ends, seats being provided for the ends of said spring barrels and cooperating friction and wedge elements enclosed in each barrel, and certain of said elements engaging the interior thereof, the seats and enclosed elements being locked together against relative turning movement, the wedge elements being connected to the body portion by bolts preferably formed with integral heads.

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 partial side elevational view and partial vertical longitudinal sectional view of one form of my cushioning mechanism shown assembled with associated draft rigging.

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

Fig. 3 is a partial end elevational view of the body member of the cushioning mechanism, shown partly in section on the line 3—3 of Fig. 1, looking in the direction of the arrows.

Fig. 4 is an end elevational view of the cushioning mechanism with the associated follower removed.

Fig. 5 is an end elevational view of one of the outer segmental shoes removed from the mechanism.

Fig. 6 is a side elevational view of the shoe shown in Fig. 5.

Fig. 7 is a fragmentary side elevational view of one of the retaining bolts.

Fig. 8 is an end view of the bolt shown in Fig. 7, looking from the left.

Fig. 9 is an end view of the bolt shown in Fig. 7, looking from the right.

Fig. 10 is a partial side elevation and partial vertical longitudinal sectional view of a modified form of cushioning mechanism involving my invention.

Fig. 11 is a fragmentary sectional view on the line 11—11 of Fig. 10, looking in the direction of the arrows.

Fig. 12 is a fragmentary sectional view on the line 12—12 of Fig. 10, looking in the direction of the arrows.

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 to 9, inclusive, there is shown one embodiment of my double-ended series friction draft gear 1, said gear preferably comprising a body member or casting 2, and a helical spring barrel 3 disposed at either end thereof. The body member or casting 2 is slotted, as indicated at 4, for receiving a draft key or other stop means 5, which extends through slots 6 in cheek plates (not shown) connected to associated draft sills (not shown), and holds the body member 2 against movement under the action of draft forces, while permitting rearward movement under the action of buffing forces, on account of the slots 6 being extended rearwardly of the normal position of the key 5. The gear or cushioning mechanism 1 may have a front follower 7, a rear follower 8, and be disposed between the arms and rear portion of a horizontal yoke 9 and a coupler 10, said yoke being connected to said coupler 10 in any usual or desired manner. The yoke normally engages a backstop 11.

Each helical spring barrel 3 is desirably formed of stock rectangular or square in section, has a plane cylindrical inner surface, and reacts between an outer spring plate or seat 12 and an inner spring plate or seat 13. Inasmuch as the spring barrels 3 and associated mechanism are

identical at both ends of the body 2, the mechanism at one end only will be described. The face of each seat 13, away from a spring 3, engages outstanding flanges 14 on a set of segmental friction elements or shoes 15, preferably two for each seat, which shoes frictionally engage the inner surface of the barrel 3, and the inner ends of which engage the body member 2 of the mechanism.

A complementary set of inner segmental friction elements or shoes 16 bear against the inner faces of the shoes 15, which faces, and the engaging surfaces of the shoes 16, are desirably generally cylindrical and have corresponding curvatures, but are normally slightly inclined to the longitudinal axis of the mechanism, and are provided at their outer ends with outstanding flanges 17 which overlap portions of the outer seat 12. A central thrust element or wedging member 18, normally seating on the follower 7 or 8, as the case may be, projects inwardly at each end of the gear and is provided with faces 19, inclined to the longitudinal axis of the mechanism, cooperating with complementary wedging faces 20 on the shoes 16. The wedge member 18 is laterally elongated in cross section, and extends substantially across the chamber of the barrel 3, interfitting between the segments of the shoes 15 and 16.

The seats 12 and 13 are generally annular in form, and the outer seat 12 is recessed, as indicated at 21, to receive the flanges 17 of the friction shoes 16 and prevent relative axial rotation therebetween. The body member 2 is provided with outstanding lugs 22 which fit in corresponding notches 23 in the flanges 14 of the shoes 15, thereby interlocking said shoes against rotation as the springs 3 unwind and rewind during compression and release of the gear. The body member 2 also has outstanding central bosses 24 around which fit the shoes 15. The lateral extensions 25 of the central wedge member 18 are disposed between adjacent side portions of the shoes 15 and 16, and prevent rotation of said wedge member with respect thereto.

In order to hold the parts of the mechanism assembled and limit outward movement of the central wedges 18 with respect to the body member 2, I connect each wedge 18 to said body member by means of a longitudinally extending bolt 26. Each bolt has a preferably integral head 27 at its outer end, and a preferably integral head 28 at its inner end. The head 28 is desirably elongated laterally, as shown most clearly in Fig. 9, and the apertures 29 in the central wedge member 18 and the corresponding apertures 30 in the body member 2 are correspondingly elongated horizontally, for example, in the embodiment illustrated, as shown most clearly in Figs. 2 and 3.

The bolts 26 may be applied for locking the parts together by inserting the head 28 of each through the apertures 29 and 30, when the head is disposed horizontally, and after said head has passed through the corresponding aperture 30, turning it about the axis of the bolt to a vertical position, or that illustrated in Figs. 1, 2 and 3, when the bolt will be locked against removal by having the end portions of its head 28 received in pockets or notches 31 extending upwardly and downwardly from the aperture 30. Undesired turning of the head 28 is positively prevented when the bolt 26 is under tension, because of the relatively snug fit of the head portions in the pockets 31. Release of the head from the aperture 30 is, of course, effected, by movement of the corresponding wedge 18 toward the body member 2 until the ends of the head are released from the pockets 31, then turning the head until it registers with the apertures 30, and removing the wedge and bolt.

The surface 32 of the head, which is adjacent the key 5, is desirably concavely curved to correspond with the curvature of the adjacent or edge portion of the key, so as to increase the engaging area where said bolt would pound against the key during operation of the gear, and provide bifurcations lying on either side of the edge portions of said key. The head 27 is too large to pass through the aperture 29, and may be formed of some desirable shape for receiving a wrench or other means for turning the bolt to locking or unlocking position, as desired.

From the foregoing description, it will be seen that I may employ the mechanism described to provide differential action for cushioning draft and buffing forces. Under the action of draft forces, the body member 2 is held stationary by the key 5, which also limits inward movement of the bolts 26 during compression of the gear, and the coupler 10 pulls the yoke 9 forwardly through its connecting means (not shown), moving the rear follower 8 and pushing the rear wedge 18 and associated friction shoes 16 into the rear friction shoes 15, compressing the rear spring housing 3, and thereby actuating only the rear cushioning mechanism or rear half of the double-ended gear 1, utilizing only one half of the total capacity of said gear 1, and at the same time permitting only one half of the movement permitted upon a full compression of said gear.

Under the action of buffing forces, however, the butt of the coupler 10 engages the front follower 7, pushing it and the associated friction wedge 18 and shoes 16 into the front shoes 15, compressing the front spring housing 3, and simultaneously moving the body casting 2 rearwardly so that the rear friction mechanism is simultaneously and similarly actuated and compressed, so that a full compression of the entire mechanism 1 is effected. On account of this action under buff, not only is an increased energy absorbing capacity provided, but a coupler travel is permitted equal to the sum of the travels permitted by the friction elements at each end of the gear. Although, for convenience and economy in manufacture, the gear is desirably made symmetrical so that the travel and capacity provided by each end is substantially identical, yet this is not essential in accordance with the broad aspect of my invention, and the capacities and travels of the two ends of the gear may be equal or different, as desired.

Although I have disclosed a manner of operating my double-ended gear so that a less amount of cushioning effect is provided for draft forces than for buffing forces, it will be understood that I do not wish to be limited to this use of said gear, as it may be used as an ordinary single-ended gear. It will also be noted that, if desired, I may use the gear so that a greater amount of draft capacity is provided than buffing capacity, by arranging the associated rigging and harnessing the gear between the associated sills of a railway vehicle in a manner such, for example, as described and claimed in the Barrows application Serial No. 606,988, filed April 22, 1932.

Referring now to the embodiment of my invention illustrated in Figs. 10, 11 and 12, a cushioning mechanism or draft gear 1b is illustrated, having a body member or housing 2b formed by side or longitudinal walls 35, 36 and 37, the

walls **35** being preferably the normally vertical walls, and the walls **36** and **37** being, respectively, top and bottom walls, although it will be understood that I am not limited to using the gear in this position. The walls **35**, **36** and **37** are connected and braced transversely by walls **38** preferably extending from the ends of connecting webs or flanges **39**. Said webs or flanges **39** and the corresponding portions of the side walls **35** are provided with longitudinal slots **4b** for receiving a draft key (not shown) or other means for connecting the housing or cushioning mechanism to associated cheek plates and/or draft sills (not shown).

The cushioning mechanism **1b** involves two sets of associated wedges or shoes and resilient means, one set disposed forwardly of the front partition **38**, and the other disposed rearwardly of the rear partition **38**. Between the two partitions, and outwardly thereof, the walls of the housing, as well as said partitions, are desirably apertured, as indicated at **40**, **41** and **42**, to facilitate core removal and assembly of the parts.

The housing is provided with a compartment or pocket **43** in each end, the forward compartment being disposed forward of the front partition **38**, and the rear compartment being disposed rearward of the rear partition **38**. Said compartments are desirably defined at their outer edges by flanges or webs **44** partially closing openings into said compartments, and preferably extending from the extreme edges of the side walls **36** and **37** adjoining the corresponding portions of the walls **35**. These flanges provide upper and lower pockets **45** in the main compartments **43** receiving upper and lower resilient means **46** which desirably take the form of sets of curved plate springs. Associated with each set of springs is a wear plate **47**, the end portions of which are desirably notched or slotted, as indicated at **48**, to receive corresponding nibs **49** which cause the individual plates to be interlocked with respect to one another and said wear plate, thereby preventing undesired lateral shifting therebetween in a manner such as described and claimed in the Suckow Patent No. 1,884,913, of October 25, 1932.

Associated with each set of springs **46** is a friction shoe or wedge member **16b** formed with a friction surface **20b** engaging a corresponding friction surface **19b** on a center wedge or spreader member **18b**. Each central wedge member **18b** desirably has an outer portion **50** extended laterally to function as a follower for engagement with a drawbar or yoke, as the case may be.

In order to facilitate release of the mechanism as well as increase the capacity of the gear, the center wedges or plungers **18b** and the associated friction shoes or wedges **16b** are formed hollow or provided with pockets receiving release springs **3b** which, in the present embodiment, take the form of relatively long coils. Said release springs act at their inner ends on the transverse partitions **38** and are centered about projections or lugs **51** outstanding therefrom. The outer ends of said springs act on annular flanged portions **52** of the wedge members **18b**. On account of using release springs, it is not necessary to make the wedges blunt enough to be self-releasing.

In order to provide renewable wearing surfaces on the transverse partition **38**, friction plates **53** are desirably applied over the outer surfaces of said partitions for engagement by the wedges **16b**, and the adjacent ends of the curved plate springs **46**.

In order to hold the parts of the mechanism assembled and limit outward movement of the central wedges **18b** with respect to the housing **2b**, I connect each wedge **18b** to said housing member by means of a longitudinally extending bolt **26b**. Each bolt has a preferably integral head **27b** at its outer end and a preferably integral head **28b** at its inner end. The head **28b** is desirably elongated laterally, as shown most clearly in Figure 12, and the apertures **29b** in the central wedge member **18b** and the corresponding apertures **30b** in the housing member **2b** are correspondingly elongated horizontally, for example, in the embodiment illustrated, as shown most clearly in Figs. 11 and 12.

The bolts **26b** may be applied for locking the parts together by inserting the head **28b** of each through the registering apertures **29b** and **30b**, when the head is disposed horizontally, and after said head has passed through the corresponding aperture **30b**, turning it about the axis of the bolt to a vertical position, when the bolt will be locked against removal by having the end portions of its head **28b** received in pockets or notches **31b** extending upwardly and downwardly from the aperture **30b**. Undesired turning of the head **28b** is positively prevented when the bolt **26b** is under tension because of the relatively snug fit of the head portions in the pockets **31b**. Release of the head from the aperture **30b** is, of course, effected in the same manner as that of the head **28** of the embodiment of Figs. 1 to 9, inclusive. The heads **27b** and **28b** may be formed as the heads **27** and **28** of the first embodiment, or as illustrated. It will also be understood that the mechanism of the present embodiment may be used like the mechanism of said first embodiment.

Although preferred embodiments of my invention have been illustrated, it will be understood that modifications may be made within the spirit and scope of the appended claims.

I claim:

1. Cushioning mechanism comprising a housing with a pocket defined by longitudinal and other walls, friction blocks movable laterally in said pocket, a wedge block with a tapered portion fitting between said friction blocks, resilient means disposed between said friction blocks and said longitudinal walls, and a bolt for limiting movement of said wedge block away from said friction blocks, said bolt having a head at each end, one of said heads being elongated, and said housing and wedge block having elongated slots for receiving said elongated head, said housing having a bolt head pocket angularly disposed to said housing slot to form a receptacle for said elongated bolt head, said bolt being locked in place after insertion by turning approximately 90° about its axis, to thereby position said elongated bolt head in said bolt head pocket.

2. Cushioning mechanism comprising a body member with a transverse draft-key-receiving slot, cushioning mechanisms comprising a helical spring barrel disposed at each end of said member, a seat for each end of each spring, cooperating segmental friction shoes anchored to said seats and some disposed adjacent said spring, and others inwardly thereof, a central wedge member in each spring acting between said friction shoes for urging them together, said central members being in wedging engagement with the inner friction shoes, and means for securing the outer elements of the cushioning mechanisms to said body member for holding the parts assembled said securing means being so disposed that the draft

key, when in place, prevents displacement thereof from operative positions.

3. Cushioning mechanism comprising a body portion formed with a transverse aperture for receiving a connecting draft key, and a helical spring barrel disposed at each end thereof, a seat for each end of each spring, cooperating segmental friction shoes arranged in pairs, the members of each pair being anchored to said seats respectively disposed adjacent said body portion and at opposite ends of the mechanism, a central wedge member at each end of the body portion and acting between said friction shoes for urging them outwardly into engagement with one another, said central members being in wedging engagement with the inner friction shoes, and bolts for holding the parts of the mechanism assembled, said bolt having a head portion aligned with the key aperture and normally engaging said key, thereby retaining the bolt in position.

4. A bolt for holding the parts of cushioning mechanism assembled, comprising a shank portion, and an integral head at each end, one of said heads being elongated laterally to provide locking lugs for engagement with locking shoulders on associated mechanism, the outer surface of said elongated head being bifurcated to straddle an edge portion of an associated draft key.

5. Cushioning mechanism comprising a body portion and cushioning means at each end comprising a longitudinally acting spring, friction elements, a central wedge between said friction elements, and a bolt for connecting each wedge to said body portion, said bolts each having a head at each end, one head of each bolt being elongated, and said central wedges and body portion having longitudinally extending slots for receiving said elongated heads, the wedge slots being laterally elongated and the corresponding body portion slots being laterally elongated in the direction of elongation of the wedge slots, so that each bolt may have its elongated head inserted through its wedge slot and on into the corresponding body portion slot and then locked in place by turning approximately 90° about its axis, said body portion having pockets extending from the slotted portions, in planes disposed approximately at right angles to the planes of elongation of the corresponding body portion slots, receiving an end portion of said elongated head, and preventing turning thereof when the head is pulled therein by the associated spring.

6. Cushioning mechanism comprising a body portion formed with a transverse aperture for receiving a connecting draft key and cushioning means at each end comprising a longitudinally acting spring, friction elements associated with said spring, a central wedge between said friction elements, and a bolt for connecting said wedge to said body portion, said bolt having an integral head at each end, one of said heads being elongated, and said central wedge and body members having normally registering elongated slots for receiving said elongated heads, the body portion having pockets extending from the slotted portions in planes angularly disposed to the planes of elongation of the corresponding body portion slots, whereby the bolts may be locked in place, after their elongated heads have been passed through the wedge and body slots, by turning about their axes until the heads fit in said body portion pockets, said draft key, when in place, normally being disposed between the adjacent heads of said bolts and holding them in locked positions by preventing movement thereof toward each other.

7. Cushioning mechanism comprising a body portion, a helical spring barrel disposed at each end of said portion, a seat for each end of each spring barrel, cooperating segmental friction shoes arranged in pairs, the members of each pair being anchored to said seats, a central wedge member acting between said friction shoes for pressing them together, said central member being in wedging engagement with the inner friction shoes, and bolts for holding the parts assembled with said body portion, each bolt having a head at each end, one of said heads being laterally elongated and said body member and the outer associated parts having elongated slots for receiving said elongated heads, the other head of each bolt being too big to pass through the slots, each bolt being locked in place, after its elongated head has passed through the corresponding elongated slots, by turning about its axis until an elongated portion of the head overlies the adjacent edge of the slotted portion.

8. Cushioning mechanism comprising a body portion slotted for receiving a draft key, a cushioning unit disposed at each end of said body portion and each unit comprising a coil spring, shoe means flanged at one end and normally acting on the corresponding end of said spring, a plurality of friction elements engaging surfaces on said shoe means on the opposite side from said spring, and formed with inclined friction surfaces, and wedge means with correspondingly inclined friction surfaces engaging the inclined friction surfaces on said friction elements, said friction elements having abutment portions at their ends acting on the other end of the associated spring, members of said units extending inward beyond the outer surfaces of said body portion and bifurcated so as to straddle edge portions of the key when in place.

9. Cushioning mechanism comprising a longitudinally acting spring, friction elements, a central wedge extending from one end between said friction elements, a member disposed at the other end of said spring, and a bolt for connecting said central wedge to said end member, said bolt having a head at each end, one head being laterally elongated and said central wedge and end member having longitudinally extending slots for receiving said elongated head, the wedge slot being laterally elongated and the corresponding end member slot being laterally elongated in the direction of elongation of the wedge slot, so that the bolt may have its elongated head inserted through its wedge slot, and on into the end member slot, and then locked in place by turning approximately 90° about its axis, said end member having a pocket extending from the slotted portion in a plane disposed approximately at right angles to the plane of elongation of said end member slot receiving the end portion of said elongated head, and preventing turning thereof when the head is pulled therein by said spring.

10. Cushioning mechanism comprising a body portion formed with a transverse aperture for receiving a connecting draft key, and cushioning means comprising a longitudinally acting spring, friction elements associated with said spring, a central wedge between said friction elements, and a bolt connecting said wedge to said body portion, said bolt having an integral head at each end, one of said heads being elongated, and said central wedge and body member having normally registering elongated slots permitting the pas-

sage of said elongated head, but preventing the passage of the other head, the body portion having a pocket extending from the slotted portion in a plane angularly disposed to the plane of elongation of the body portion slot, whereby the bolt may be locked in place, after its elongated head has been passed through the wedge and body slots, by turning until the head fits in said pocket, said draft key, when in place, normally having an edge engaging said elongated head and holding it in locked position by preventing movement thereof out of said pocket.

11. Cushioning mechanism comprising a body portion, a helical spring barrel disposed at one end of said portion, a seat for each end of said spring barrel, cooperating segmental friction shoes arranged in pairs, the members of each pair being anchored to said seats, a central wedge member acting between said friction shoes for pressing them together, said central member being in wedging engagement with the inner friction shoes, and a bolt for holding the parts assembled with said body portion, said bolt having a head at each end, one of said heads being laterally elongated, and said body member and the part at the opposite end of said spring having elongated slots for receiving said elongated head, the other head of said bolt being too big to pass through the slots, whereby said bolt is locked in place after its elongated head has passed through the elongated slots by turning about its axis until an elongated portion of the head overlies the adjacent edge of the slotted portion.

12. Cushioning mechanism comprising a body portion, slotted for receiving a draft key, a cushioning unit disposed at one end thereof and comprising a coil spring, shoe means flanged at one end and normally acting on the corresponding end of said spring, a plurality of friction elements engaging surfaces on said shoe means on the opposite sides from said spring and formed with inclined friction surfaces, and wedging means with correspondingly inclined friction surfaces engaging the inclined friction surfaces on said friction elements, said friction elements having abutment portions at their ends acting on the other end of the spring, a member of said unit extending inward beyond the outer surface of said body portion and bifurcated so as to straddle an edge portion of said key when in place.

13. Cushioning mechanism comprising a body portion formed with side walls and a transverse web connecting said walls, cushioning means associated with said body portion and including a wedge and retaining bolt engaging said wedge, said web having a slot therethrough adapted for the reception of an end of said bolt during assembly of the parts, said side walls having slots disposed entirely on the opposite side of said web from said wedge, and a key passing through said slots in the side walls and adapted to limit movement of said gear, said key being positioned adjacent an end portion of said bolt to limit inward movement thereof during compression of the mechanism.

14. Cushioning mechanism comprising a body portion slotted for receiving a draft key, cushioning means associated with said body portion and including a bolt detachably securing said cushioning means to the body portion, said bolt having a head portion normally aligned with said key slot said draft key being adapted to engage said bolt head for preventing inward movement thereof.

15. Cushioning mechanism comprising a body portion slotted for receiving a draft key, cushioning means associated with said body portion, a bolt having a unitary head on one end thereof detachably securing said cushioning means to the body portion, said head normally aligned with said key slot and adapted to engage said draft key, thereby restricting the inward movement of said bolt.

16. Cushioning mechanism comprising a housing having a pocket at each end, said pockets being defined by longitudinal walls and a transverse wall, friction blocks movable laterally in said pockets, a wedge block extending into each pocket having a tapered portion interposed between said friction blocks, resilient means disposed between said friction blocks and longitudinal walls, said resilient means being positioned outwardly of said transverse wall and being substantially coextensive with each pocket, additional resilient means disposed between said wedge blocks and transverse wall, a bolt for limiting the movement of each wedge block away from said friction blocks, said bolt having an elongated head at one end thereof and said transverse wall and wedge blocks having elongated slots for receiving said elongated head, said bolt being locked in place after insertion by turning approximately 90 degrees about its axis.

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