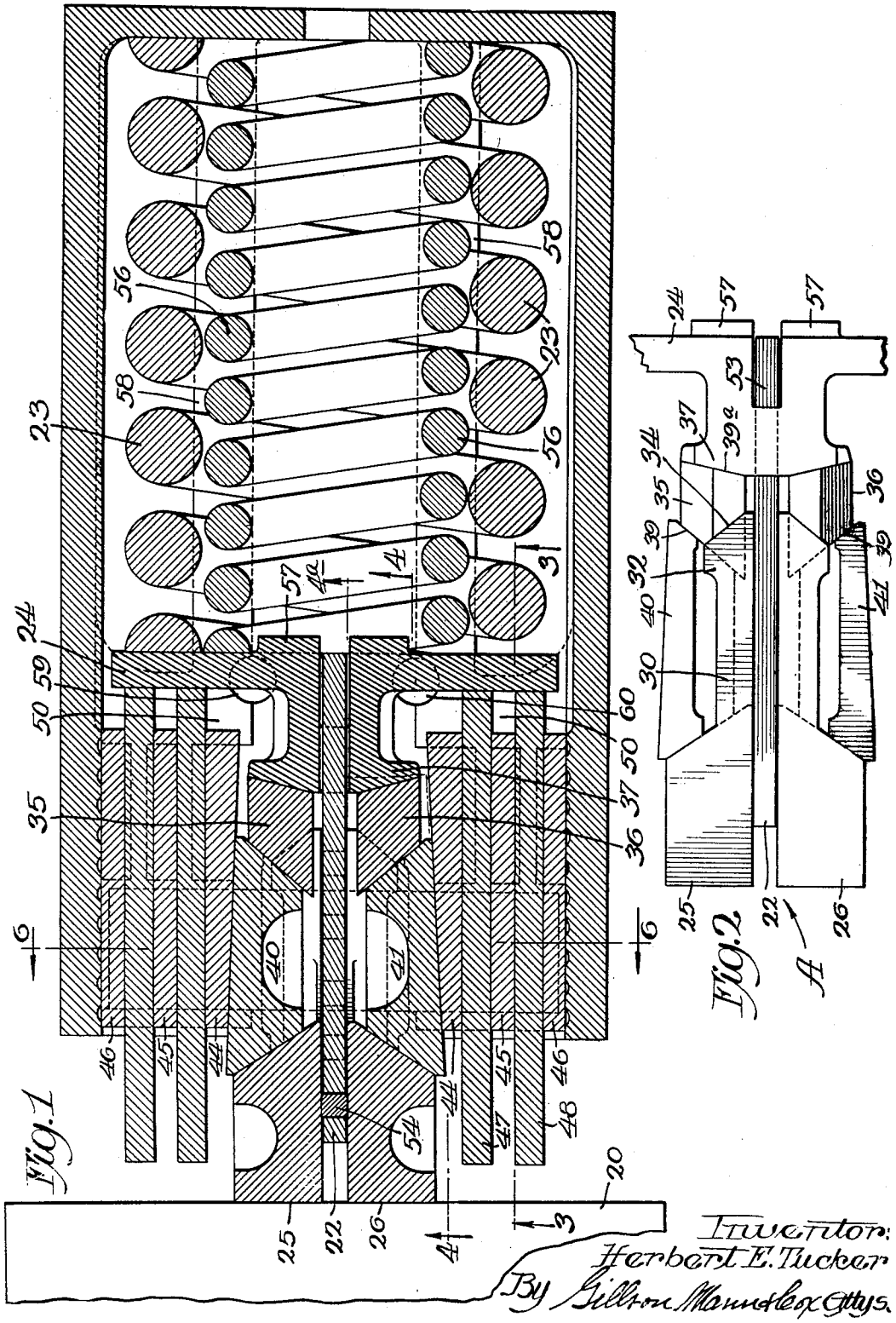
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Fig. 3

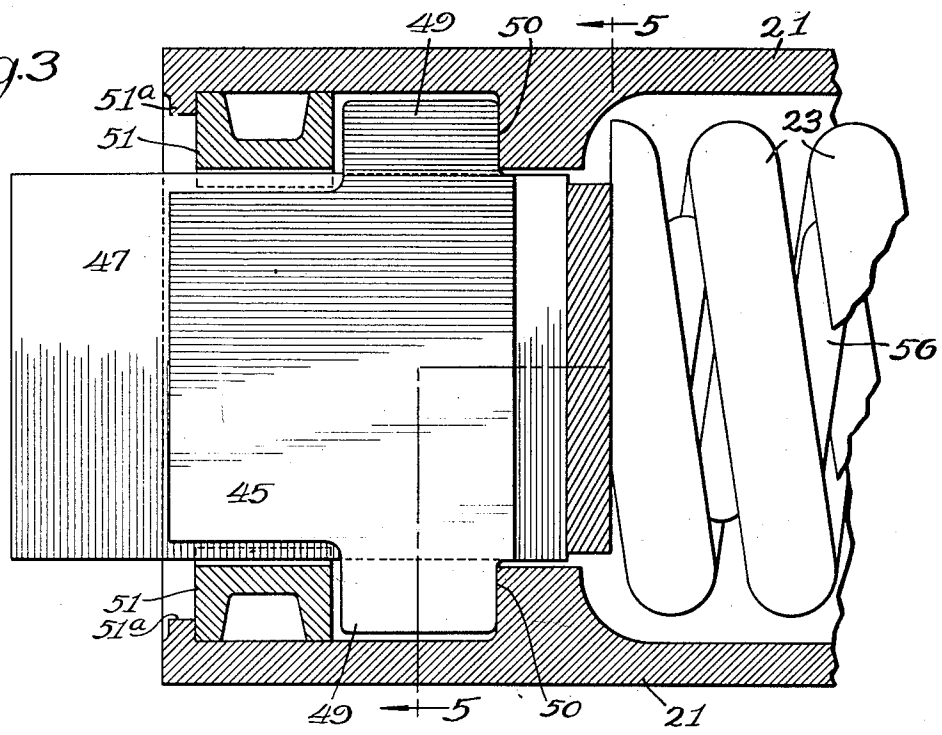
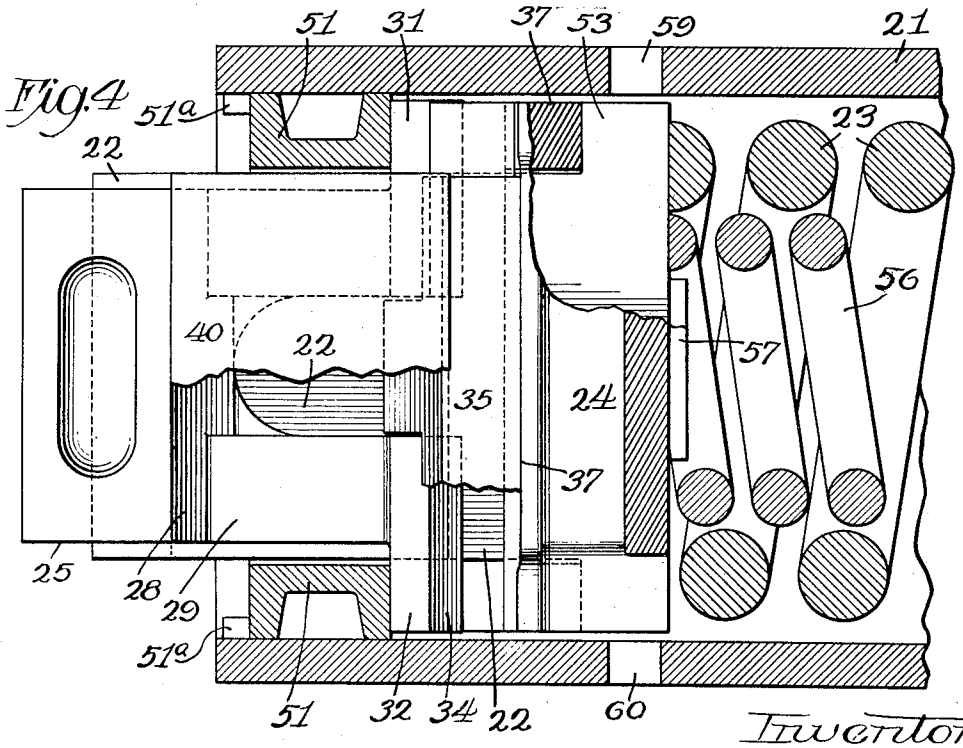


Fig. 4



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Fig.6

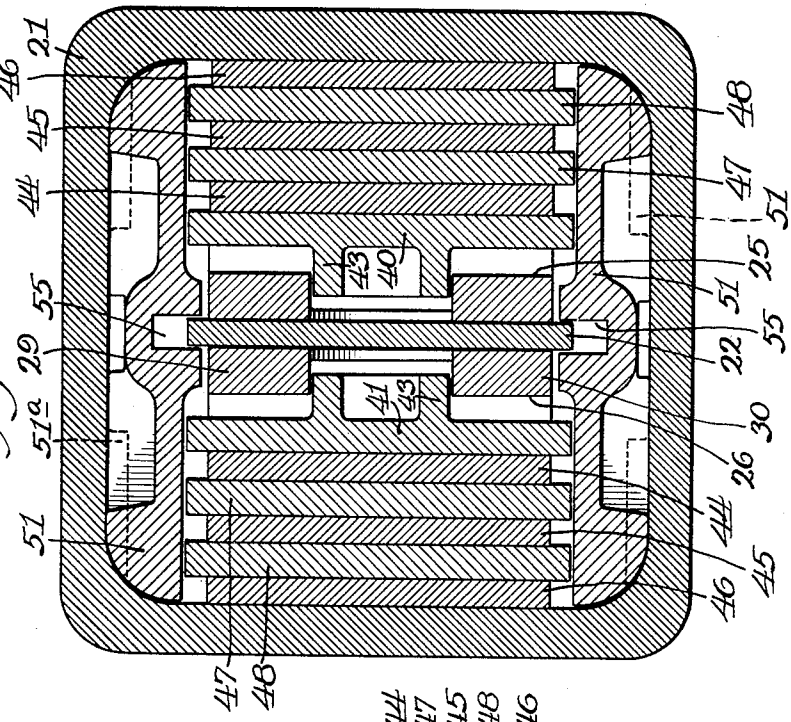
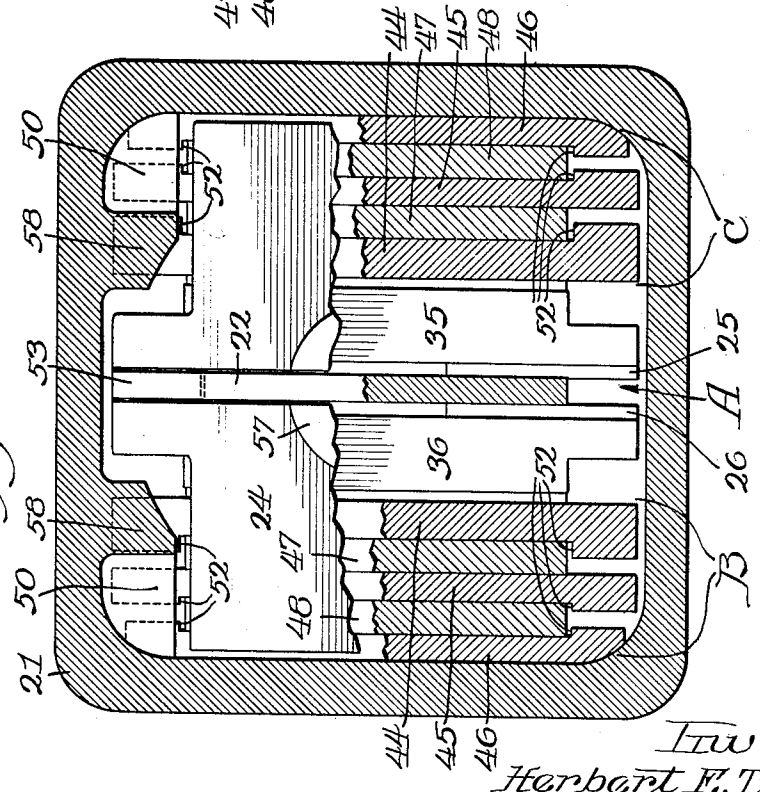


Fig.5



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Fig. 13

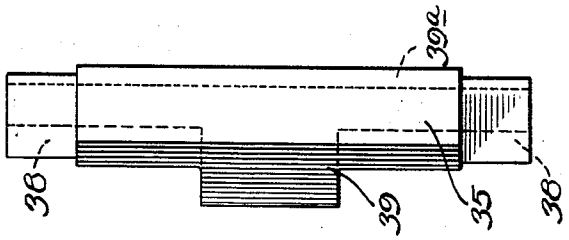


Fig. 14

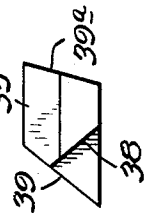


Fig. 11

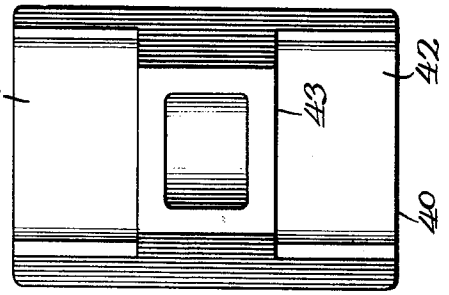


Fig. 12

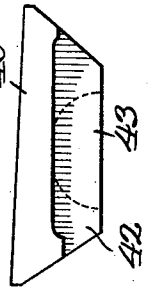


Fig. 9

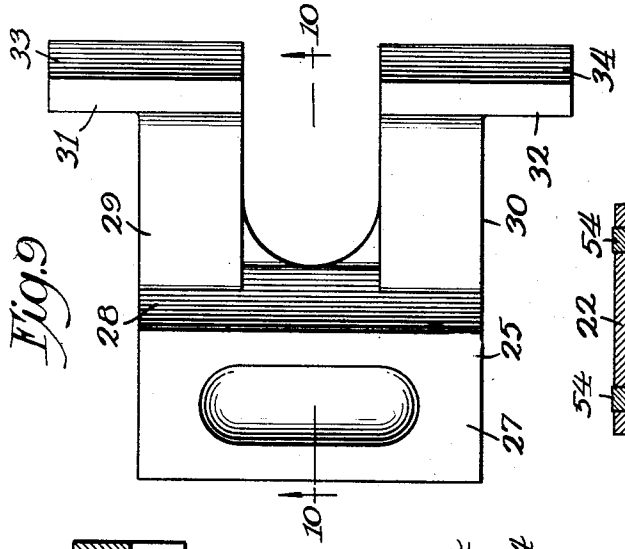


Fig. 8a

Fig. 10

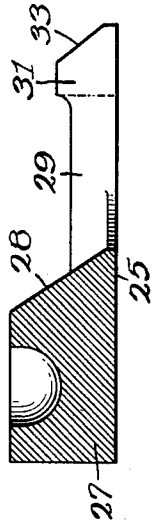


Fig. 7

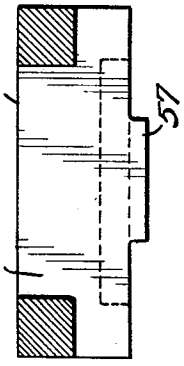
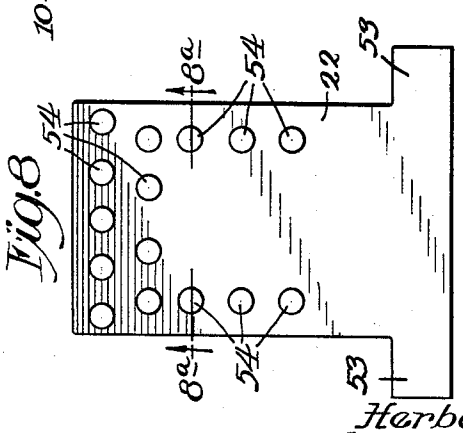


Fig. 8



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UNITED STATES PATENT OFFICE

1,930,701

DRAFT GEAR

Herbert E. Tucker, South Bend, Ind., assignor to Universal Draft Gear Attachment Co., a corporation of Illinois

Application May 16, 1928. Serial No. 278,169

6 Claims. (Cl. 213—33)

The invention relates to draft gears for railway cars and among its objects are the securing of high efficiency and durability and to provide for the taking up of wear to the end that efficiency may be maintained.

Further objects will appear in connection with the description of the device.

The invention consists in a structure, such as is hereinafter described, and as illustrated in the accompanying drawings in which

Fig. 1 is a central, longitudinal plan section;

Fig. 2 is a detail in plan of the central wedging system and central friction element of the gear;

Fig. 3 is a detail sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a sectional view in part on the plane of the line 4—4 of Fig. 1, with some parts broken away, and in part on the line 4*a*—4 of Fig. 1;

Fig. 5 is a transverse sectional view in two planes as indicated by the dotted line 5—5 of Fig. 3;

Fig. 6 is a transverse sectional view on the line 6—6 of Fig. 1;

Fig. 7 is a sectional view of the spring seat cutting through the axis thereof;

Fig. 8 is an elevation of the central friction element;

Fig. 8*a* is a sectional view on the line 8*a*—8*a* of Fig. 8;

Fig. 9 is an elevation of one of a portion of thrust wedging members;

Fig. 10 is a sectional view partly in elevation taken on the line 10—10 of Fig. 9;

Figs. 11 and 12 are respectively side and end views of one of a pair of wedging shoes; and

Figs. 13 and 14 are similar views of one of a pair of wear compensating wedging elements.

The embodiment of the invention illustrated comprises a plate follower 20 and a chambered follower or casing 21; a central unit generally designated A and consisting of a pair of groups of wedging elements and a central friction element 22 hereinafter referred to as a drag member; helical springs 23 (a pair of nested springs being shown) enclosed within the casing 21 and reacting between its closed end and a spring seat 24 having the character of a follower; and two groups of intercalated friction plates generally designated, respectively B and C, located between the unit A and the side walls of the casing 21.

The central unit A comprises a pair of thrust wedging elements 25, 26, which seat against the follower 20. The adjacent faces of these elements are flat and receive between them and constantly frictionally engage the central drag element 22. Each of the elements 25, 26, one of which is shown in detail in Figs. 9 and 10, consists of an end block 27 having its inner face forwardly and inwardly inclined forming an obtuse wedging face 28, and a pair of arms 29, 30 extending forwardly from the end portions of the face 28, each arm carrying at its inner end an integral laterally projecting block 31, 32, having wedging faces 33, 34, parallel with the face 28.

The unit A further comprises a pair of wedge blocks 35, 36, which seat against a forwardly projecting stem 37 of the spring seat 24. The faces of these blocks, opposite to their seating faces, are provided with oppositely inclined wedging faces 38, 39, the former being complementary of and engaging the wedging faces 33, 34 of the blocks 31, 32 for the purpose of urging these blocks and the arms 29, 30 carrying them into engagement with the friction element 22. The wedging faces 39 are oppositely inclined relatively to the wedging faces 38. The inner or seating face 39*a* of the element 35 is preferably somewhat inclined as shown in Figs. 1 and 14 to facilitate release, the stem 37 being provided with complementary seats.

Seated between the wedging face 28 of each of the elements 25, 26 and the wedging face 39 of each of the elements 35, 36 is a wedging shoe 40, 41. The outer faces of these shoes are flat and the marginal portions of their inner faces are cut away, as indicated at 42, to accommodate the arms 29, 30, leaving a central boss 43 which slidingly fits between these arms, thereby holding the parts in assembled relation.

The two groups B, C, of intercalated friction plates are alike, each comprising a set of plates 44, 45 and 46 which are anchored to the casing 21 against longitudinal movement relatively thereto, but are free to move laterally, and plates 47, 48 which float between the anchored plates.

As shown, the plates of the former set are three in number and of the latter, two. The number employed may be varied actually or relatively, as may be found expedient.

The plates 44, 45, 46 are shorter than their companion plates, and are shown as located adjacent the open end of the casing 21. Each of these plates is provided adjacent its inner end

with laterally projecting wings 49 (Figs. 3 and 8) which engage shoulders 50, formed on the casing 21, and locking bars 51 fitted within the casing and held in place by means of ribs 51*a* thereon. The bars 51, 51, but for convenience in assembling and replacement, might be made as integral ribs of the casing.

The floating plates 47 and 48 in the release position of the gear bear against the spring seat 24 and project a considerable distance beyond the casing, as shown in Fig. 1, terminating, however, short of the follower 20.

The shorter plates are of greater width than the longer ones and are provided along their side faces with shoulders as shown at 52 against which the lateral margins of the longer plates loosely fit, thereby maintaining the proper relation of the parts. One of the shorter plates, preferably the inner one 44, tapers towards its outer end, as plainly shown in Fig. 1, thereby presenting wedging faces to the outer faces of the shoes 40, 41, which are correspondingly inclined.

The central friction element 22 is preferably in the form of a plate, its inner end projecting through a slot in the spring seat 24, and being provided with laterally projecting wings as 53 (Figs. 4 and 8) which seat in lateral extensions of the slot in the spring seat extending only partly therethrough. The plate is thereby prevented from withdrawal from the casing while the spring 23 prevents its inward movement relatively to the seat.

Preferably, the member 22 is provided with a number of perforations which are filled with metal plugs 54 of an alloy, such as brass or bronze, having a lower coefficient of friction than the metal of which the plate is formed to insure a smoother action.

The element 22 is somewhat wider than the wedge members of the central unit of the gear in order that it may extend into recesses as 55, formed in the members 51, whereby it is maintained in central position.

Where nested springs are employed, the inner one 56 may be held in central position by means of a boss 57 on the face of the spring seat 24. Ribs, indicated at 58, formed in the casing walls serve as guides for the outer spring.

For convenience in assembling and replacement of parts, a pair of alined apertures 59, 60 are formed in opposite walls of the casing 21, their axes being back of the normal position of the front face of the spring seat 24. By inserting pins (not shown) in these holes after the spring has been sufficiently compressed to clear them, the spring and seat are retained upon release of the pressure.

In assembling the gear, the springs are first inserted. The central friction element 22 is placed within the slot in the spring seat 24, and these parts are now inserted in the casing and forced inwardly against the resistance of the springs to clear the holes 59, 60 into which pins are entered for temporarily maintaining the springs under compression. The shorter plates are introduced and moved laterally against the side of the casing. The central wedging elements are now inserted. The bars 51, 51 are then placed in position; the shorter plates are spread apart; the shoes are entered; and the longer plates inserted.

Pressure now being applied to move inwardly the wedging elements to still further compress the springs, the pins in the holes 59, 60, are relieved from the spring pressure and may be withdrawn. The parts will now assume their normal positions and will be held in place, the shoulders 31, 32 on wedge members 25 and 26 engaging the bars 51, 51, limiting release travel.

The operation of the gear is the same in the buff and draft. In buff, the thrust elements 25, 26 being moved inwardly, advance the shoes, and the blocks 35, 36. This initial movement causes the compression of the springs, the wedging elements of the central unit acting as a pair of columns, the friction between the elements 25, 26 and plate 22 contributing to the advance of the latter. As the shoes advance, they are forced laterally inward by the wedging plates 44, 44, thereby crowding the blocks 35, 36 forward and further advancing the spring seat which carries the plate 22 with it against the resistance of its friction with the elements 25, 26. The inward movement of the spring seat moves it away from the longer plates 47, 48. When the follower 20 comes into engagement with the latter plates, they are forced inwardly. The compression of the plates due to the wedging action develops high friction between the two sets and largely absorbs the shocks.

As in draft gears generally, the springs absorb the shocks to the extent of their capacity, but the limited space available prevents the use of springs of sufficient size and strength to save the casing from bursting stresses, unless very heavy castings are employed. In the gear herein disclosed, this spring resistance is supplemented by the greater frictional resistance between the plate 22 and the elements 25, 26, thereby reducing the lateral pressure.

The lighter shocks are absorbed by the friction between the various parts of the central unit, the shoes and the tapering plates and the springs which continue to act during the heavier shocks and, in addition, high frictional resistance is developed by the movement of the floating plates relatively to the anchored plates.

Upon release, the central unit is carried back, relatively to the casing by the spring pressure, relieving the wedging action of the shoes upon the tapering plates. A too free release, however, is prevented by the slight wedging action of the blocks 35, 36 and of the shoes upon the elements 25, 26, urging the latter against the plate 22. The backward movement of the elements 25, 26 is less than the movement of the plate 22, whichever is retarded by the friction between these parts, thus insuring a somewhat retarded and smooth release, the use of the insets 54 being a contributory factor.

The release may be further retarded by slightly inclining the contacting faces of the wedge members 35, 36 with the stem 37 of the spring seat, as shown. The follower 24 having been carried away from the plates 47, 48 upon the compression of the gear, there is no friction developed between these plates and their associated plates at the commencement of the release, and when the spring seat overtakes the longer plates, the wedging compression thereon will have been suppficiently relieved to permit them to move outwardly without material retarding friction. The parts come to rest when the shoulders 31, 32 reach the bars 51.

In draft, the casing 21 moves forwardly, the elements 25, 26 remaining stationary. The relative movements of all of the elements are, however, the same as in buff.

The wedge blocks 35, 36 and the wedging faces

of the elements 25, 26 cooperating with the shoes compensate for the wearing of the parts, the spring pressure in cooperation with the wedging action of the faces 33, 34 of the elements 25, 26, and 38 of the blocks causing the latter to move outward laterally as wear occurs, insuring a continuous intimate contact of all of the elements of the gear without appreciably lessening the initial force of the springs.

The resistance to both compression and release may be varied through a wide range by changing the pitch of the various wedging faces.

The disclosed embodiment of the gear has been found to be highly efficient, but various changes may be made in it within the scope of the invention.

I claim as my invention:

1. In a draft gear, in combination, a pair of opposed followers, one thereof being chambered, groups of intercalated friction plates inclosed within the chamber, the inner plate of each group being tapered toward its outer end, a spring seated against the closed end of the chambered follower, a spring seat engaging the opposite end of the spring, a central unit interposed between the other follower and the last-named spring seat, such unit comprising a pair of wedging thrust members engaging the follower, a pair of wedging thrust members associated with the seat, a pair of wedging shoes interposed between the outer and inner thrust members and bearing upon the tapering plates, and a drag plate anchored to the seat and frictionally engaging the first named thrust members.

2. In a draft gear, in combination, a pair of opposed followers, one thereof being chambered, friction plates housed within the casing and at opposite sides thereof and being relatively longitudinally movable, acute wedging elements laterally bearing upon the plates, friction shoes engaging such wedges and having obtuse wedging faces at their ends, a pair of thrust wedge members cooperating with the outer ends of the shoes, a pair of thrust wedge members cooperating with the inner end of the shoes, a spring seat bearing upon the second named thrust members, a spring reacting between the seat and the closed end of the chambered follower, and a drag plate anchored to the seat and slidable between the first named thrust members.

3. In a draft gear, in combination, a pair of opposed followers, one thereof being chambered, friction plates housed within the chamber and at opposite sides thereof and being relatively longitudinally movable, acute wedging elements laterally bearing upon the plates, friction shoes engaging such wedges and having obtuse wedging faces at their ends, a pair of thrust wedge members cooperating with the outer ends of the shoes, a pair of thrust wedge members cooperating with the inner ends of the shoes, a spring seat bearing upon the second named thrust wedges, the contacting faces of such parts being inclined outwardly and toward the seat, a spring reacting between the seat and the closed end of the chambered follower, and a drag plate anchored to the seat and slidable between the first named thrust members.

4. A pair of opposed followers, one thereof being chambered, a movable spring seat enclosed within the chamber, a spring reacting between the inner end of the chamber and the seat, a group of intercalated friction plates at each side of the chamber and adjacent the outer end thereof, the inner plate of each group being tapered toward its outer end, friction shoes engaging the tapered plates, thrust wedge means engaging the outer ends of the shoes, thrust wedge means engaging the inner ends of the shoes and the seat and having wedge faces engaging outwardly and backwardly inclined wedging faces of the seat.

5. In a draft gear, in combination, a casing, a spring seated against the inner end of the casing, a movable spring seat engaging the opposite end of the spring, two groups of intercalated friction plates within the casing, two sets of longitudinally arranged wedging elements interposed between the groups of plates and bearings as columns upon the spring seat, and a drag plate anchored to the spring seat and located between the two sets of wedging elements and resisting the lateral reaction thereof, the drag plate being in direct engagement with certain of the wedge elements.

6. In a draft gear, in combination, a chambered follower, a spring seat within the follower, a spring reacting between the seat and the inner end of the follower, a central friction plate anchored to the seat, an opposed follower, two groups of intercalated friction plates, one set of each group being anchored to the chambered follower and the other set being engageable by the spring seat on release, a pair of wedging friction shoes, one interposed between each group of plates and the central plate, wedge means associated with the seat for applying spreading pressure to the shoes, and a pair of thrust members seated against the opposed follower and frictionally engaging the central plate and having wedging faces cooperating with the shoes.

HERBERT E. TUCKER.