C. S. CORNING.

DRAFT GEAR.

APPLICATION FILED JUNE 8, 1909.

954,378.

Patented Apr. 5, 1910.

4 SHEETS—SHEET 1.

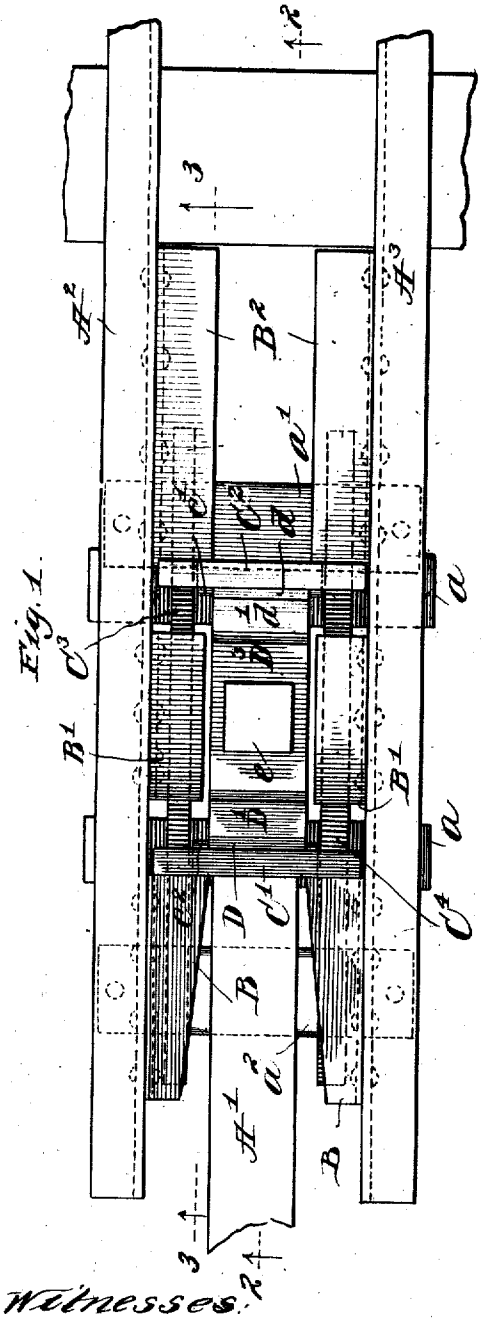

Fig. 1.

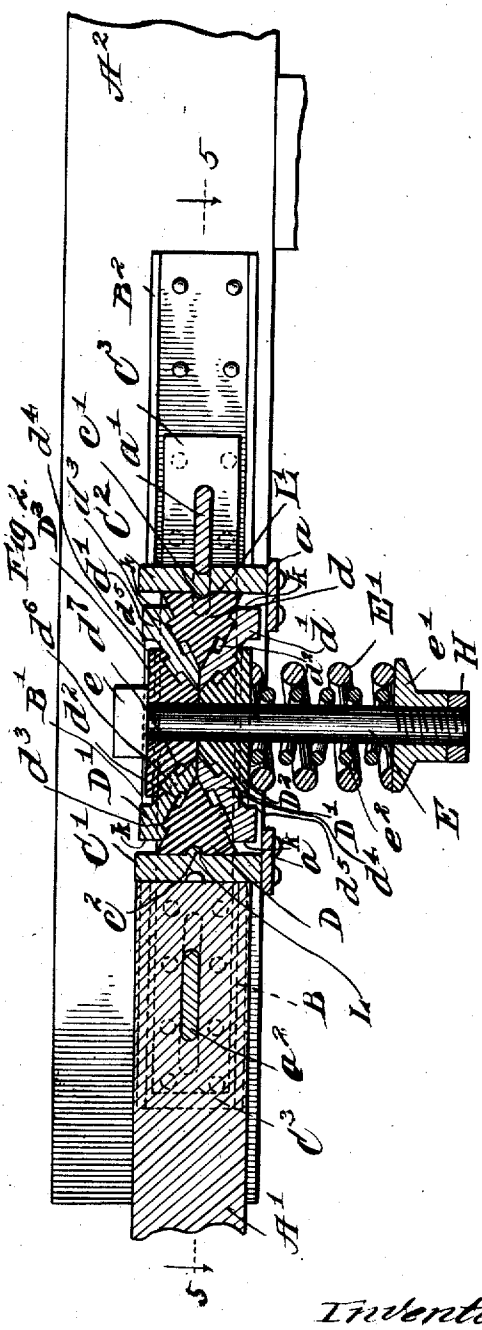

Fig. 2.

Witnesses.

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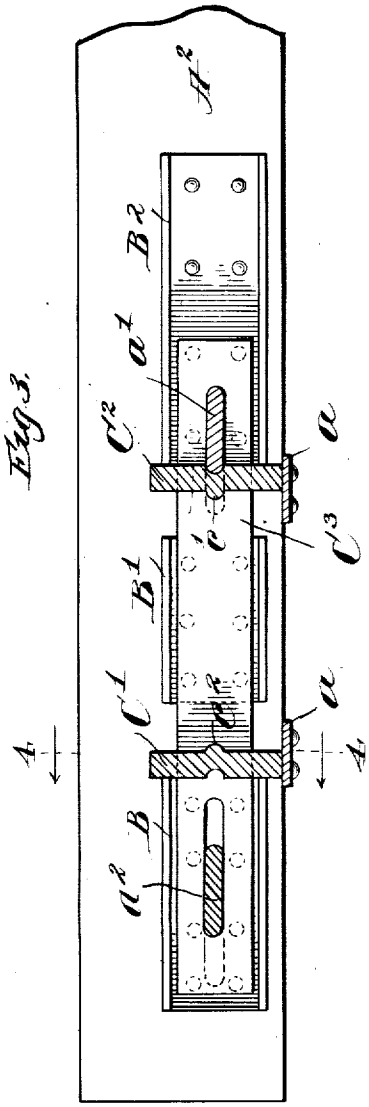

Fig 3.

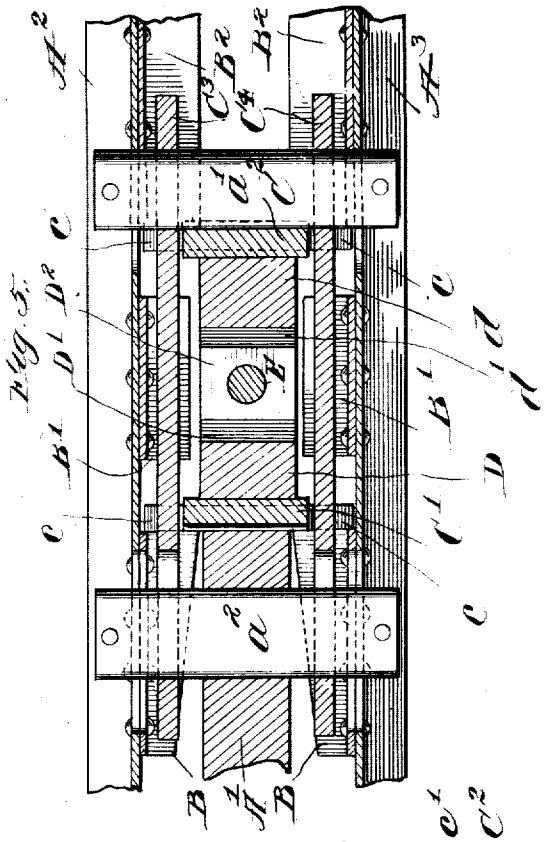

Fig 5.

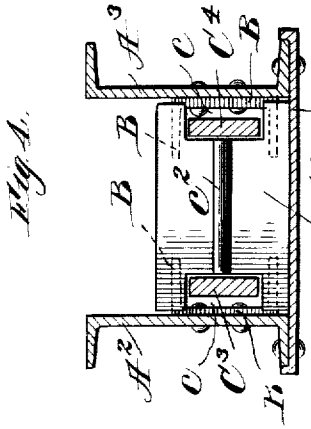

Fig 4.

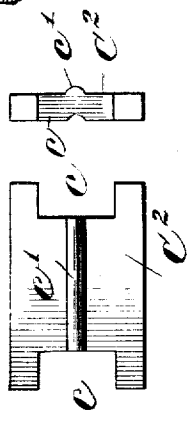

Fig 6.

Fig 7.

Witnesses:

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4 SHEETS—SHEET 3.

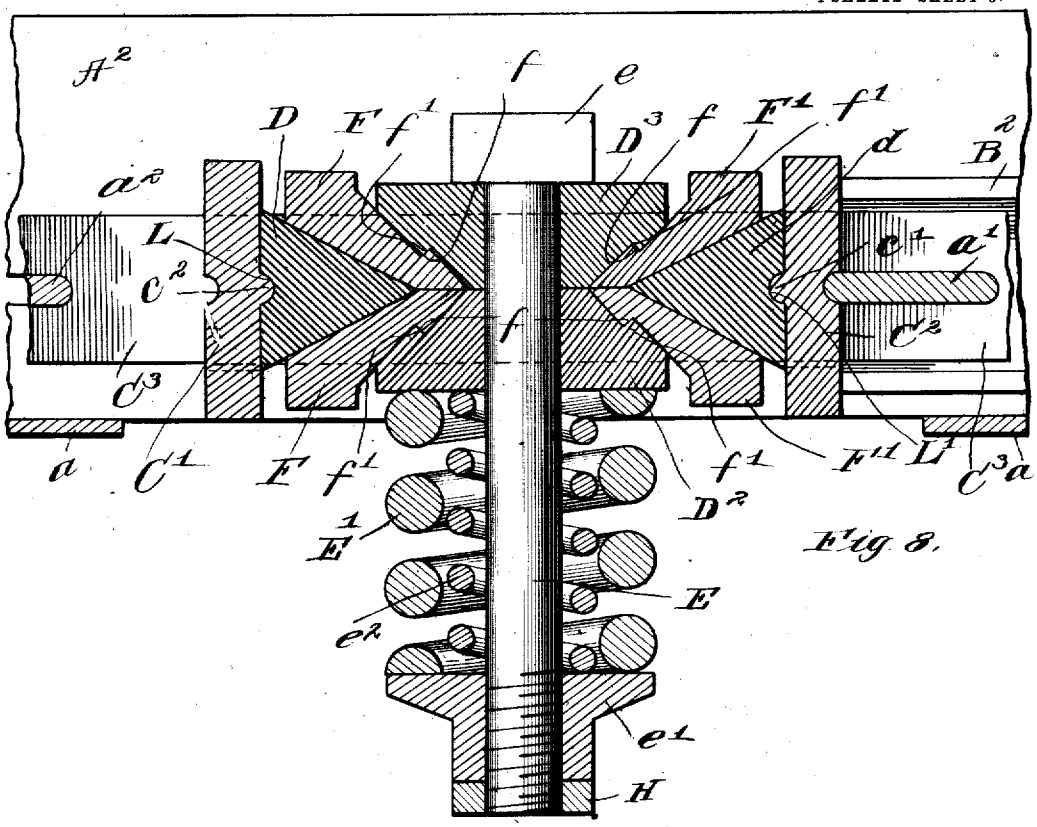

Fig. 8.

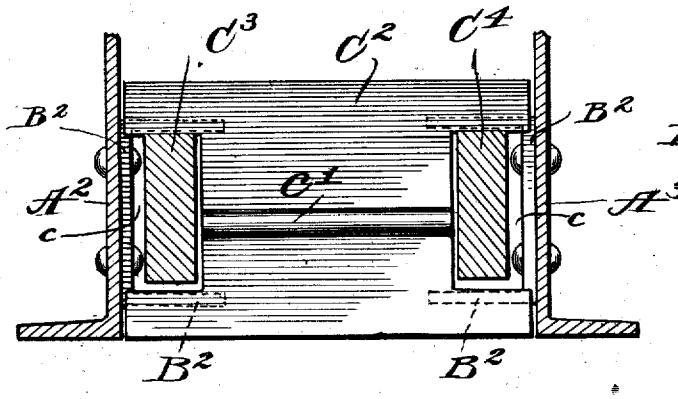

Fig. 9.

Witnesses:

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4 SHEETS—SHEET 4.

Fig. 14.

Fig. 11.

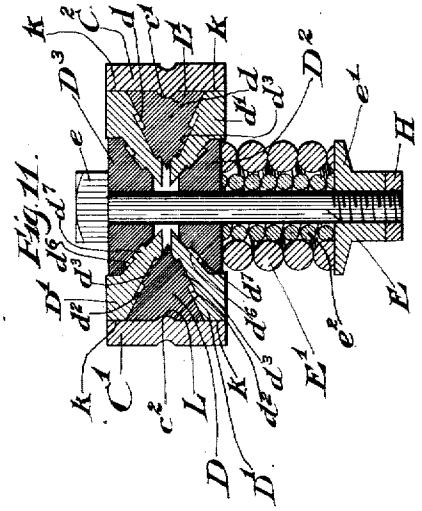

Fig. 15.

Fig. 16.

Fig. 13.

Fig. 10.

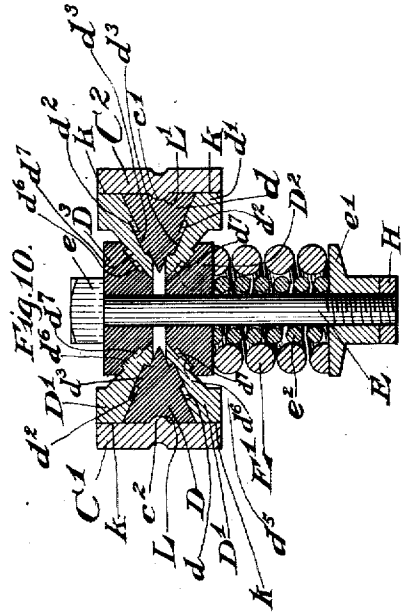

Fig. 18.

Fig. 17.

Fig. 12.

Witnesses:

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UNITED STATES PATENT OFFICE.

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DRAFT-GEAR.

954,378. Specification of Letters Patent. Patented Apr. 5, 1910.

Application filed June 8, 1909. Serial No. 500,975.

To all whom it may concern:

Be it known that I, CHARLES S. CORNING, a citizen of the United States, residing at Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Draft-Gears, of which the following, taken in connection with the drawings, is a description.

The primary object of my invention is to provide a friction draft gear for railway cars, one adapted to be arranged within the space between the center sills of the ordinary car underframe in such a manner that the parts are all readily accessible for inspection, renewal or adjustment as required.

A further object of my invention is to provide a friction draft gear having the friction elements so arranged that they engage each other and are supported by a bolt or rod passing perpendicularly through the center members only, which bolt, in connection with the spring, holds the friction elements together and carries them in proper position as well as keeping the members through which it passes in line with each other; thus doing away entirely with barrels, casings, pocketed follower plates or other form of container.

Another object of my invention is to divide the resistance offered by the device to the blows of service between two sets of friction surfaces having different angles or pitches, whereby the beginning of the drawbar movement, on either pull or buff, is against friction surfaces of easy angle or pitch, while the latter part of the drawbar movement is against friction surfaces having harder or more abrupt angles, thus providing a light resistance for light blows and a stubborn resistance for heavy blows.

Another object of my invention is to carry the weight at each end of the friction elements as well as keep all friction members in line without the use of pocketed follower plates, barrels, casings or other form of container.

Another object of my invention is to so arrange the friction members that at the beginning of the drawbar movement the end members only bear against the follower plates, and other members are brought into bearing against the follower plates as the draw bar movement progresses and the strain increases.

Another object of my invention is to so construct the friction elements in a friction draft gear that they will form a rigid section subject to crushing strains only at the completion of the drawbar movement in either direction.

Other objects of my invention and advantages of construction will be hereinafter more fully described and pointed out in the claims.

In the drawings,—Figure 1 is a plan view of my friction draft gear with the draw bar and sills broken away; Fig. 2 is a sectional view taken on line 2—2 of Fig. 1; Fig. 3 is a like view taken on line 3—3 of Fig. 1; Fig. 4 is a transverse sectional view taken on line 4—4 of Fig. 3; Fig. 5 is a plan view taken on line 5—5 of Fig. 2; Figs. 6 and 7 are respectively a plan and an end view of one of the follower plates; Fig. 8 is a sectional view through the friction members showing a modified form of engagement; Fig. 9 is a transverse sectional view illustrating the manner of carrying the follower plates upon the links; Fig. 10 is a sectional view of the friction members showing their position when the drawbar has moved one and one-half inches in either direction; Fig. 11 is a sectional view of the friction members showing their position at the completion of the drawbar movement; Figs. 12 and 13 are respectively side and end views of the links as shown at C^3, C^4; Fig. 14 is a side view of another form of link; Figs. 15 and 16 are respectively end and front views of the draft lugs as shown at B′; Figs. 17 and 18 are respectively top and end views of one of the keys.

A^2, A^3 represent the longitudinal center sills of the car frame, which may be of the usual construction, having the tie straps a, a, riveted or bolted to the bottom thereof. Opposite slots are provided in these sills through which pass the transversely extending keys a', a^2.

A′ is the drawbar having a slot through which the forward key a^2 passes, as shown in Figs. 1 and 2.

Draft lugs or stationary abutments B, B′, B^2, are preferably riveted to the center sills

in front of, between and back of the follower plates. These draft lugs are of new and novel design for this purpose, having inwardly projecting arms which engage the follower plates above and below the links forming, in connection with the recesses in each end of each follower plate, rectilinear openings through which the links pass. These draft lugs are the stops or stationary abutments against which the follower plates impinge as will be described in the operation of the device. The inwardly projecting arms of the front pair of draft lugs B, at each end of the car are sheared or shaped as shown on the plan view, Fig. 1, in order to allow the coupler head limited lateral movement without the shank of the draw bar impinging against the draft lugs and thus creating a side strain on the car structure. The front lugs B, are also provided with slots through which the forward key passes, said slots being coincident with the slots in the car sills. The draft lugs B′ which, are preferably riveted to the center sills between the follower plates, act as stationary abutments against which the rear follower C^2 abuts on the forward movement of the drawbar and against which the front follower C′ abuts on the rearward movement of the drawbar. The inwardly projecting arms of these draft lugs act as stops to the lateral movement of the friction members as will be seen by reference to Fig. 5. The function of the draft lugs B^2 which are riveted to the car channels back of the rear follower plate is to form a stationary abutment for the rear follower plate C^2. They are provided with slots through which the rear key, a', passes, the slots being coincident with the slots in the center sills.

Extending longitudinally of the center sills and upon the inside thereof are the links C^3, C^4, each of which has two elongated openings through which pass the keys a', a^2. At the front and rear of the friction members is a follower plate C′, C^2. These follower plates have a recess c, c, at each end through which said links C^3, C^4, are carried upon the keys a', a^2, without interfering with the bearing of the follower plates against the draft lugs. Extending preferably across the center of each follower plate is a rib c', c^2, which has a twofold purpose; first to provide a surface which will engage the grooves in the end friction members and form a carrying support; and second, to stiffen the follower plates and give them additional strength to prevent bending.

Arranged in the rectangular space formed by the sills A^2, A^3, and the follower plates C′, C^2, are the friction blocks comprising the end members D, d, the intermediate members D′, d', and the center members D^2, D^3. These members are preferably provided with tongues and grooves as shown in Fig. 2 which are so spaced with respect to one another that at the end of the drawbar movement the tongues are in contact with the metal at the ends of the grooves in which they move. The tongues on the intermediate members which work in the grooves in the center members also act on the release as will be described in another paragraph. I contemplate also the use of oppositely facing shoulders upon these different members instead of tongues and grooves. The tongues and grooves between the intermediate and end members are not essential to the successful working of the device and are used more as a means of keeping the members in line than as a means of arresting the movement of these members. Each of the end friction members D, d, is provided with a groove or depression L, L′, across the surface which is in bearing against the follower plate, and into this groove fits the convex side of a rib c^2 or c', upon the follower plate C^2 or C′, forming a carrying support for the end friction members. This form of construction I consider to be new with me regardless of the disposition of the remaining elements of the gear. As will be observed the angles of the impinging friction surfaces of these different members bear such relation to one another that the center members D^2, D^3, are moved along the impinging friction surfaces of the intermediate members D′, d', only after the end members D, d, have been forced in between the intermediate members to their limit of friction movement. Fig. 10 shows the position of the friction members at this point. The frictional resistance is thus divided between two sets of friction surfaces, one set having different angles or pitches than the other; and provides a comparative slight resistance for approximately the first half of the drawbar travel and a much greater resistance for approximately the last half of the drawbar travel; the latter part of the drawbar movement being against friction surfaces having more abrupt angles than is the case with the first part of the drawbar movement.

In the construction above described the weight of the front end of the friction members is carried by the rib on the follower plate C′ fitting into the groove L in the front member D, the follower plate being supported by the tie strap a which is riveted or bolted to the center sills of the car and the front follower slides across this tie strap. The weight of the rear end of the friction members is carried by the rib on the follower plate C^2 fitting into the groove L′ on the rear friction member d, the follower plate, C^2, being supported by and sliding on the rear tie strap a. The rear key a' fits into the groove, c', on the rear follower plate C^2.

Passing vertically through the center of

the center friction members, D^2, D^3, is a rod or bolt, E, provided with an integrally formed head, *e*, on the top thereof. Near the bottom of the bolt is a spring seat, *e'*, supported and held in position by the nut H. Surrounding this bolt E between the spring seat *e'* and the lower surface of the center friction member D^2 is the compression spring E', the upper end of which is in bearing directly against the under surface of the friction member D^2 while the lower end is in bearing against the spring seat *e'*. The friction members are held in position by the bolt E and the compression springs E', e^2, and are held in line laterally by the tongue and groove engagement previously described; all friction members being maintained in position without pocketed follower plates, barrels, casings or any other form of container for the friction members.

While but one double compression spring is shown I do not wish to be limited to this construction, or to this number of springs.

In Fig. 8 I have shown a slight modification of the manner of engagement between the intermediate friction members, F, F', and the center friction members D^2, D^3. In this construction I use the same ribbed and grooved follower plates C', C^2 and the friction members all assume the same relative position as shown in Fig. 2, but instead of having the different friction members interlock by tongues and grooves I provide the center members D^2, D^3 with shoulders *f'* which form abutments for oppositely facing shoulders *f* on the intermediate members F, F'. In this form of construction the friction members are kept in line laterally by the inwardly projecting arms of the draft lugs B' which, in addition to their other functions, act as stops to the lateral movement of the friction members. The inwardly projecting arms of the draft lugs B' also act as stops to the lateral movement of the friction members in the form of construction shown and described.

The advantages of the construction will be apparent to those skilled in the art. The accessibility of the parts, ease of inspection and repairs, absence of pocketed follower plates, barrels, casings or other forms of containers for the friction parts, two separate and distinct sets of friction surfaces having different angles or pitches, draft lugs between the follower plates acting as stops to the lateral movement of the friction parts; ribbed and grooved follower plates, draft lugs having inwardly projecting arms, and auxiliary supports for the follower plates.

Although the construction here shown is that of a car having a steel or metal underframe I do not wish to confine myself to that form of construction alone. Neither do I wish to be limited to the drawbar travel as given in another paragraph, as it is obvious the drawbar travel may be increased or decreased either by lengthening the friction members and prolonging their friction surfaces or shortening them and diminishing the length of their friction surfaces, or the same result can be obtained by changing the pitch or angles of the friction surfaces.

In Fig. 9 I have illustrated the follower plates carried upon the links C^3, C^4, which pass through the recesses in the ends of the followers. The links C^3, C^4 are carried at each end upon the keys *a'*, a^2, which extend through slots in the car sills A^2, A^3, and are supported thereby.

It will be noticed that in the form of construction previously described (where the follower plates are carried on the tie straps) the links would act as supports to the follower plates in case the tie straps should fail. That is to say, should the tie straps, for any reason, fail to carry the follower plates then the follower plates would instantly fall into bearing on the links which pass through the recesses in the follower plates and the successful operation of the draft gear would not be interrupted. Thus a new and novel way of providing auxiliary supports for the follower plates is provided.

It will be noticed that the two end members D, *d*, move horizontally and the remaining friction members D', *d'*, D^2, D^3, move apart vertically while moving longitudinally of the car sills. In order to differentiate between the movement of the two end friction members and the movement of the remaining friction members it is proper to refer to the two end members D, *d*, as movable horizontally and to the members D', *d'*, D^2, D^3, as movable vertically.

In operation I will first describe the forward pull, reference being made most frequently to Fig. 2. The drawbar A' being moved forward imparts movement to all of the movable parts of the device except the front follower plate C' and the front friction member D. These parts remain stationary, the follower plate C' being in bearing against the draft lugs B and the front friction member D is in bearing against the follower plate. The first part of the movement is along the impinging friction surfaces between the end friction members D, *d*, and the intermediate friction members D', *d'*, and continues until the tongues d^3 on the end friction members D, *d*, are at the opposite ends of the grooves d^2 in the intermediate members D', *d'*, and the faces *k*, *k*, *k*, *k*, on the intermediate members are in bearing on the follower plates C', C^2. The angles of the impinging friction surfaces between the end and intermediate members are easier or less abrupt than are the angles of the impinging friction surfaces between

the intermediate and center friction members, and thus the center friction members D^2, D^3, do not begin to move along the impinging friction surfaces of the intermediate friction members D', d', until the perpendicular faces k, k, k, k, of the intermediate members are in bearing against the follower plates. At this point the two upper intermediate friction members and one upper center friction member are separated from the two lower intermediate friction members and one lower center friction member by three quarters of an inch and the spring has been compressed three quarters of an inch. Fig. 10 shows the position of the friction members at this point. The second part of the movement now begins. The forward movement of the drawbar being continued the center friction members D^2, D^3, are forced apart vertically along the impinging friction surfaces of the intermediate friction members D', d', until the shoulders d^4 on the center friction members are in bearing against the shoulders d^5 on the intermediate members and the tongues d^6 on the intermediate friction members are at the opposite ends of the grooves d^7 in the center friction members. A rigid section subject to crushing strains only has thus been created. Fig. 11 shows the position of the friction members at the completion of the drawbar movement. During the first part of the movement just described the drawbar moves forward one and one half inches and the springs E', e^2, are compressed three quarters of an inch. During the second part of the movement the drawbar moves forward one and one eighth inches and the springs are compressed one and one quarter inches; making a total drawbar travel of two and five eighths inches and a total spring compression of two inches. At the completion of the drawbar movement the keys are metal to metal against the ends of the slots in the car sills, the front follower plate C' is metal to metal against the front draft lugs B, and the rear follower plate C^2 is metal to metal against the center draft lugs B'. This provides four points of bearing for the keys and four points of bearing for the follower plates with a rigid metal section between the follower plates. Any additional strain will be jointly shared by the keys a', a^2, and the draft lugs B, B', with a rigid metal section between the followers, such additional strain not being confined to keys, lugs or friction members alone. The rigid metal section is formed by the friction members acting jointly and at the same time. It will be noted that the drawbar movement is arrested jointly by the keys reaching the ends of the slots in the car sills at the same time the rear follower C^2 comes in bearing against the draft lugs B' and the rigid section is created by the friction members.

The action of the parts is the same on the buff as on the pull with the exception that movement is imparted to the friction members through the shank of the drawbar which is forced rearward while in full bearing against the front follower plate C'. In this operation the links do no work, they simply carry the rear key forward on the pull. The points of bearing on the buff are the same as those on the pull, except that the front follower plate goes back against the draft lugs B' and the rear follower plate C^2 remains stationary against the rear draft lugs B^2 and the rear key a'. The rear friction member d remains stationary against the rear follower plate. Any excess strain will be distributed to the various points as previously described on the pull, with the exception that the follower plates bear against different ends of the draft lugs and the keys are in opposite ends of the slots in the car sills. When the strain is removed the center members D^2, D^3 are forced toward each other by the spring pressure and move along the impinging friction surfaces of the intermediate members D', d', until the tongues d^6 on the intermediate members bear against the opposite ends of the grooves d^7 in the center members. When this point is reached the center and intermediate members move along the impinging friction surfaces of the end members D, d, until all parts have resumed their initial position.

It will be observed that when the friction members are assembled in position they are held therein by the bolt or rod E which passes perpendicularly through the center members only; and to remove all friction members from the positions shown in the drawings all that is necessary to be done is to remove the nut H when the spring seat e', springs E', e^2, bolt E and all friction members will drop from between the sills.

When the car sills are mentioned reference is made only to the two center sills, (otherwise known as center channels or draft sills) that run longitudinally of the car structure and between which the draft gear is disposed.

While the drawings show tongues on the intermediate members and on the end members and grooves in the intermediate and center members, I do not wish to be limited to that form of construction alone.

Where I have used in the claims "friction members between said sills and follower plates," or any similar expression, I intend to designate the location of the friction members in the rectangular space bounded longitudinally, or on the ends, by the follower plates, and laterally, or on the sides, by the center sills.

While I have herein shown and particu-

larly described the preferred embodiment of my invention I do not wish to be limited to the precise details of construction shown.

Having thus described my invention I claim as new and desire to secure by Letters Patent:—

1. In a draft gear, the combination, with the car sills, of a slotted drawbar, keys passing through slots in said sills, the forward key passing through the drawbar, recessed follower plates between said sills, links passing through the recesses in said follower plates, and friction members between said follower plates.

2. In a draft gear, the combination, with the car sills and slotted links, of ribbed, recessed follower plates, friction members, the end friction members being supported upon the follower plates, and a bolt passing vertically through the center friction members only.

3. In a draft gear, the combination, with the car sills, of friction members movable horizontally and engaging a follower plate, friction members movable vertically and having their impinging friction surfaces at different angles from the angles of the impinging friction surfaces between the horizontally movable friction members and the vertically movable friction members, follower plates, a bolt passing through the center friction members only, and a spring around said bolt.

4. In a draft gear, the combination, with the car sills, of a slotted drawbar, keys passing through slots in said sills the forward key passing through the drawbar, draft lugs having inwardly projecting arms, recessed follower plates, links carried by said keys and passing between the arms of the draft lugs and through the recesses in the follower plates, friction members movable horizontally and supported by the follower plates, friction members movable vertically, the angles of the impinging friction surfaces of the vertically movable friction members being more abrupt than the angles of the impinging friction surfaces between the horizontally and vertically movable friction members, a bolt passing vertically through the center friction members, and a spring around said bolt beneath the friction members.

5. In a draft gear, the combination, with the car sills, of a slotted drawbar, keys, slotted links, recessed follower plates, draft lugs having inwardly projecting arms, horizontally movable friction members having tongue and groove connection with the impinging vertically movable friction members, vertically movable friction members having tongue and groove engagement with each other upon their impinging friction surfaces, a bolt passing vertically through the center friction members, and a spring around said bolt beneath the friction members.

6. In a draft gear, the combination, with the car sills, of transversely extending keys, slotted links carried thereon, draft lugs having inwardly projecting arms, friction members having different angles on their friction surfaces, recessed follower plates, a bolt passing vertically through the center friction members, and a spring around said bolt beneath the under surface of the lower friction member.

7. In a friction draft gear, a slotted draw-bar, keys, draft lugs having inwardly projecting arms, recessed follower plates, friction members having shoulders, d^4, d^5, which impinge when the drawbar has reached the limit of its travel.

8. A friction draft gear having a plurality of friction members, the center members, D^2, D^3, movable apart vertically along the impinging friction surfaces after the horizontally movable members have completed their friction movement.

9. A friction draft gear having two end friction members grooved transversely on the surfaces which bear against the follower plates.

10. In a friction draft gear, the combination with a slotted draw-bar, of transversely extending keys, slotted links, recessed follower plates, draft lugs having inwardly projecting arms, a spring seat, a spring, a bolt passing vertically through the spring seat the spring and the center friction members, and friction members having different angles on their friction surfaces, the center and intermediate friction members having oppositely facing shoulders d^4, d^5, which impinge at the completion of the draw-bar movement.

11. In a friction draft gear, the combination, with a draw-bar, of a follower, vertically movable wedge-blocks, a vertically acting spring tending to draw said wedge-blocks toward each other, and differential angle blocks interposed between said follower and wedge-blocks.

12. In a friction draft gear, the combination, with a draw-bar, of a follower, vertically movable wedge-blocks D^2, D^3, a horizontally movable wedge-block D, bearing against said follower, differential angle blocks interposed between the wedge-block D and wedge-blocks D^2 and D^3, and a vertically acting spring tending to hold said wedge-blocks D^2, D^3, together.

In witness whereof I hereunto subscribe my name in the presence of two witnesses.

CHARLES S. CORNING.

Witnesses:
A. A. PARKER,
J. E. CHISHOLM.