March 16, 1937. J. A. SHAFER 2,073,761

DRAFT GEAR

Filed March 29, 1933 5 Sheets-Sheet 1

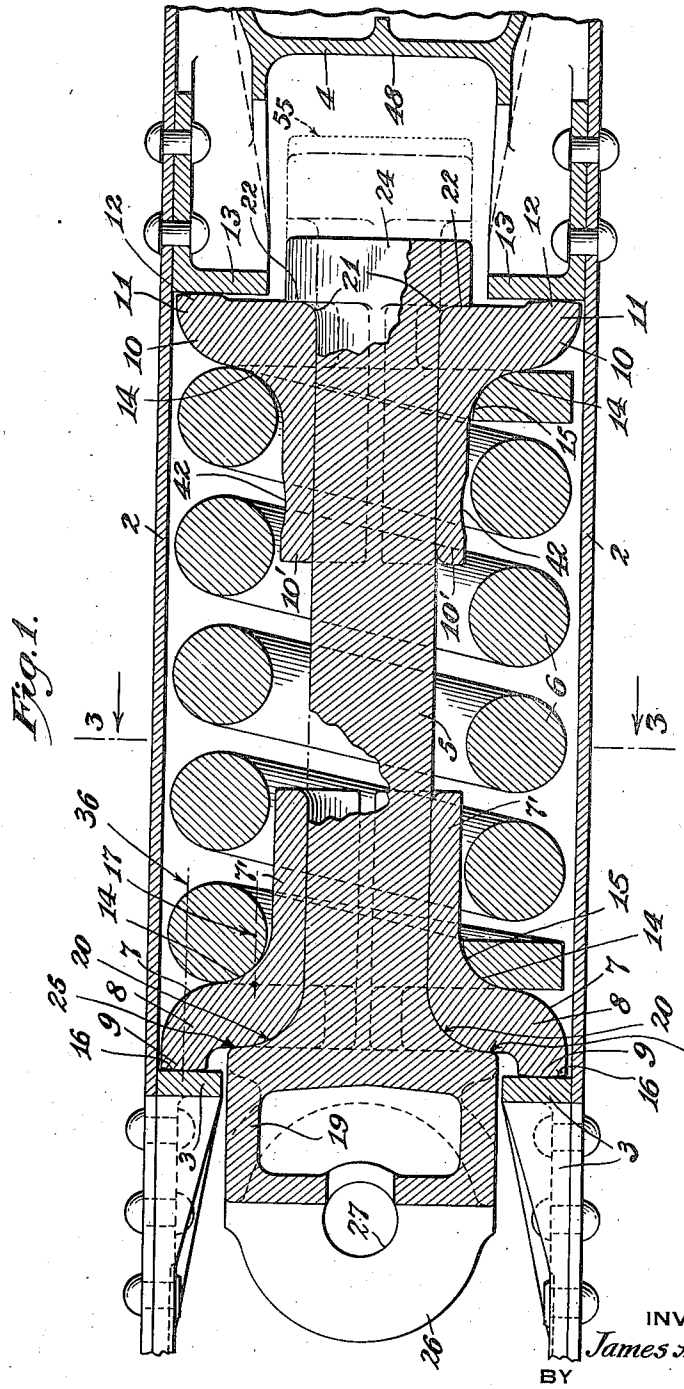


Fig. 1.

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March 16, 1937. J. A. SHAFER 2,073,761

DRAFT GEAR

Filed March 29, 1933 5 Sheets-Sheet 2

Fig. 2.

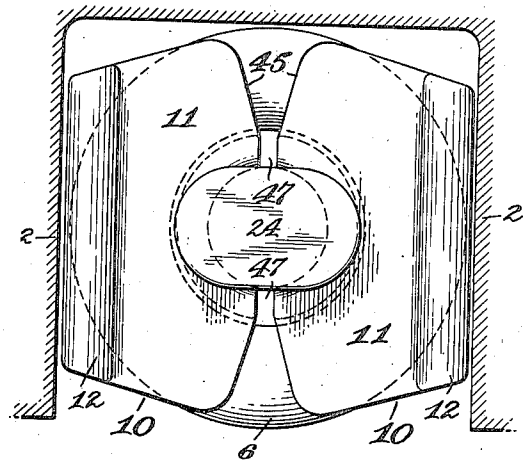


Fig. 3.

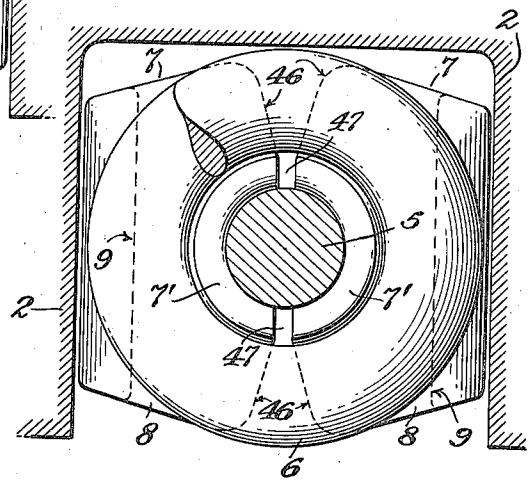


Fig. 4.

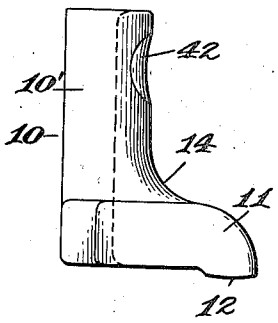
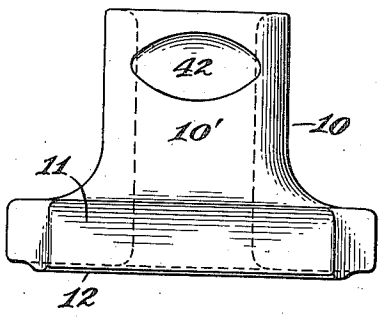


Fig. 5.



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March 16, 1937. J. A. SHAFER 2,073,761

DRAFT GEAR

Filed March 29, 1933 5 Sheets-Sheet 3

Fig. 6.

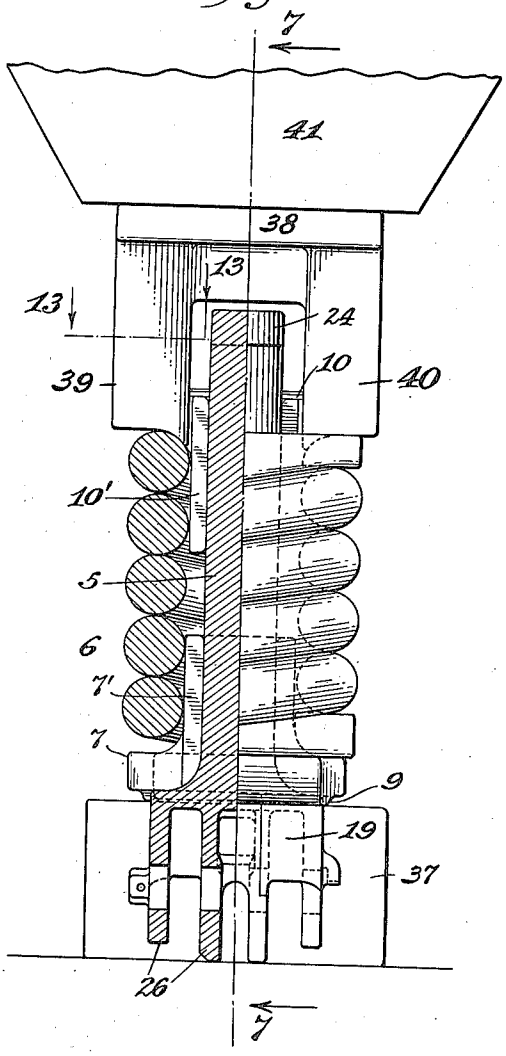


Fig. 7.

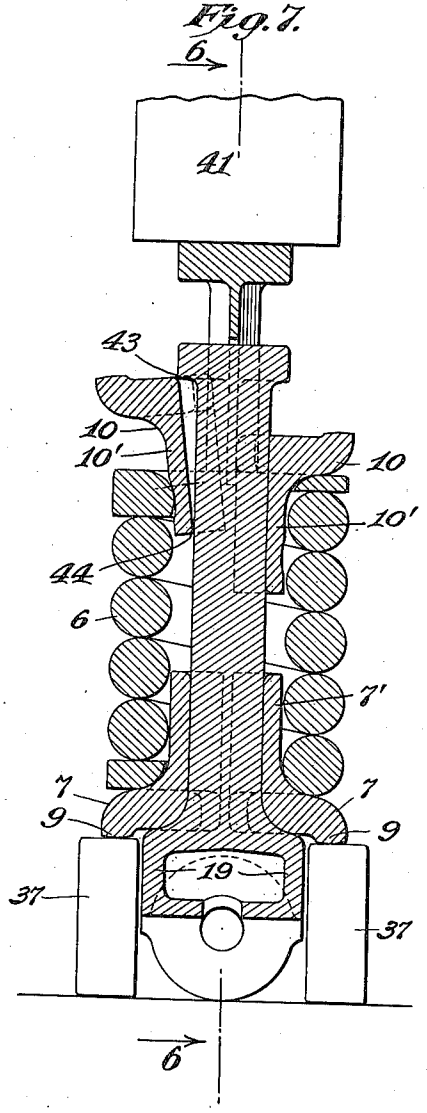


Fig. 13.



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March 16, 1937. J. A. SHAFER 2,073,761

DRAFT GEAR

Filed March 29, 1933 5 Sheets-Sheet 4

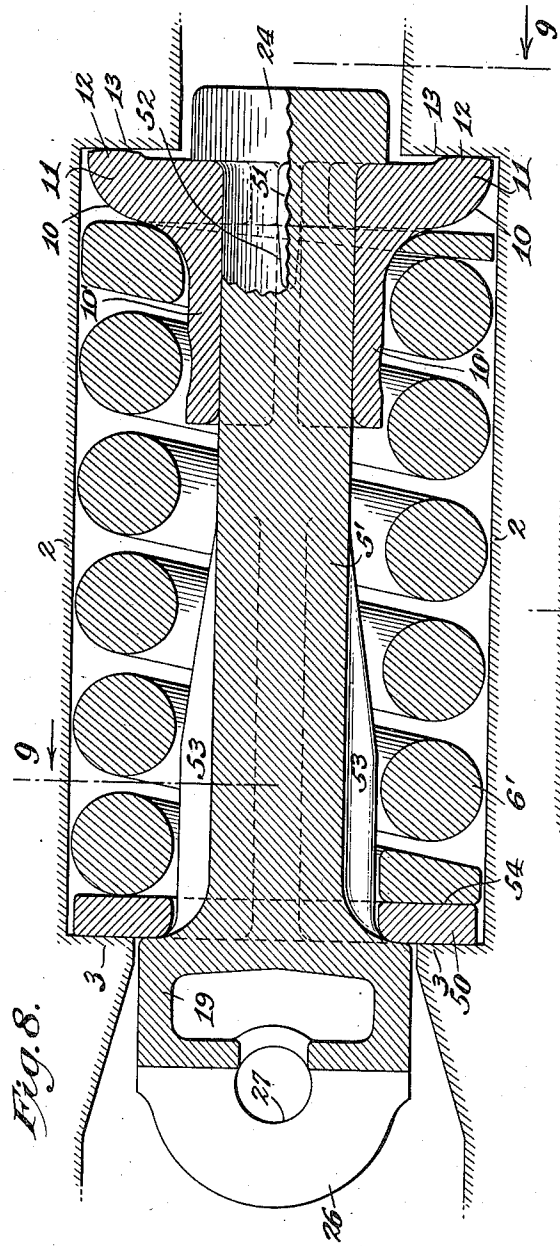


Fig. 8.

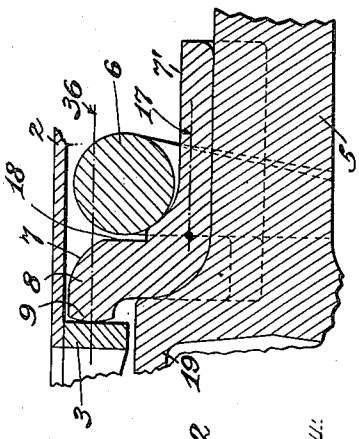


Fig. 10.

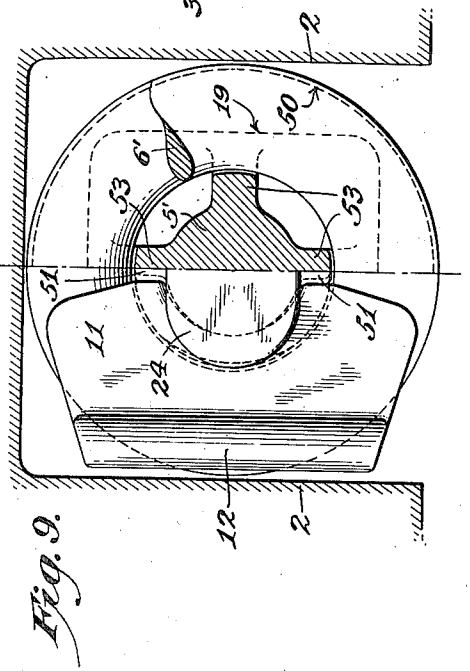


Fig. 9.

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March 16, 1937. J. A. SHAFER 2,073,761

DRAFT GEAR

Filed March 29, 1933 5 Sheets-Sheet 5

Fig. 11.

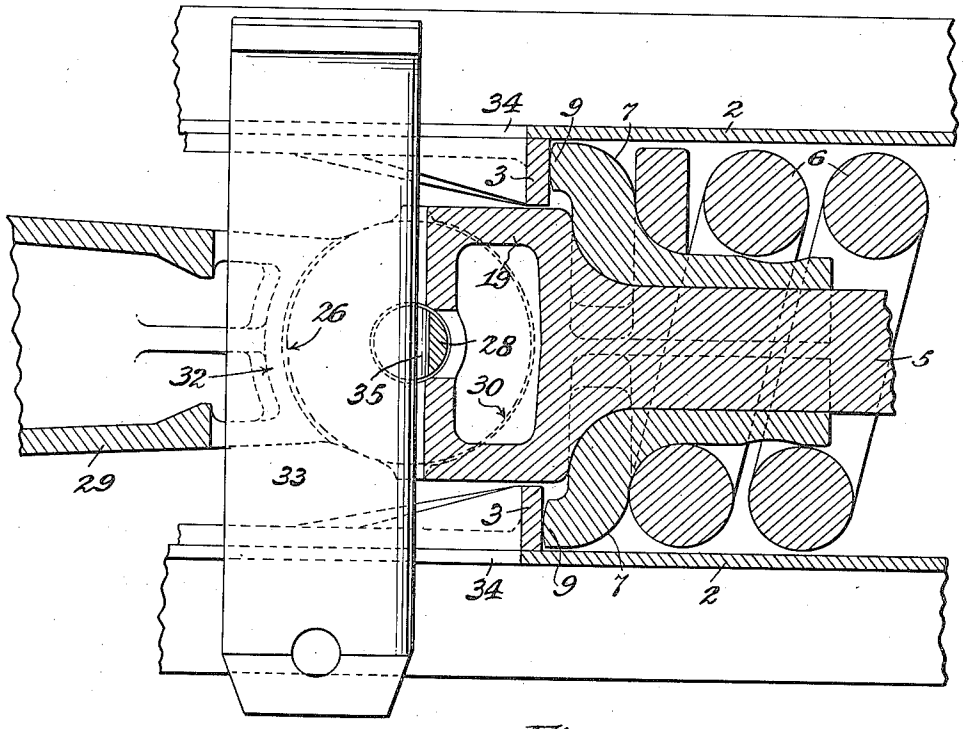
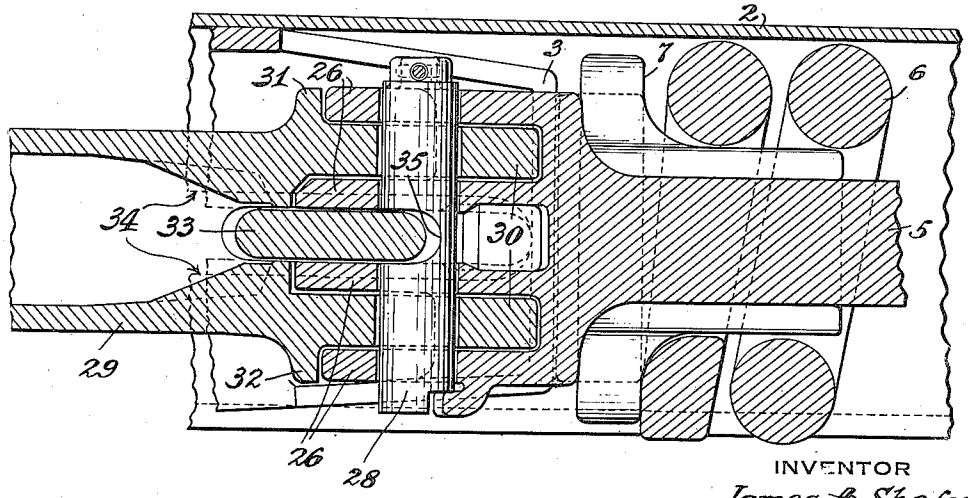


Fig. 12.



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UNITED STATES PATENT OFFICE

2,073,761

DRAFT GEAR

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Application March 29, 1933, Serial No. 663,277

25 Claims. (Cl. 213—35)

This invention relates to railway draft gears. One of its objects is the provision of a novel draft gear of particularly simple construction involving a minimum number of parts and susceptible of manufacture and assembly at low cost and with marked facility. The invention further provides a draft gear of high spring capacity, substantially exceeding that of the friction elements. An additional feature of my draft gear is the inclusion of a spring not only of high cushioning capacity, but which also is able to receive and withstand oversolid blows. The gear is furthermore applicable to existing railway cars without any change in the standard dimensions of the draft pocket formed by the conventional sills and lugs. My novel draft gear also enables the elimination of yokes and followers, and furthermore requires no bolts or tie-rods for maintaining the gear in assembled condition. The invention further provides for maintaining of the gear in condition for effectively absorbing draft and buffing stresses despite prolonged wear of the friction surfaces. Other features reside in provisions for fulcruming the shoes at one or more ends of the spring, and for causing the spring to exert not only a longitudinal force upon the shoes but also a force in such direction as to urge the shoes of a pair into firm engagement with opposite sides of the friction member. Furthermore, the invention comprises novel provisions for assembly of the parts. Other features and advantages will be hereinafter described and claimed.

In the accompanying drawings:

Fig. 1 is a horizontal sectional view with parts in elevation and parts broken away, showing a draft gear embodying my invention.

Fig. 2 is a rear view of the draft gear, looking forwardly of the rear or buffing lugs in Fig. 1.

Fig. 3 is a transverse vertical section taken on line 3—3 of Fig. 1.

Figs. 4 and 5 are views in side elevation and plan respectively of one of the rear shoes of the gear.

Fig. 6 is a view partly in vertical section on line 6—6 of Fig. 7 and partly in elevation illustrating a method of assembly of the gear.

Fig. 7 is a vertical sectional view taken on line 7—7 of Fig. 6 with parts in elevation.

Fig. 8 is a horizontal sectional view showing a modification of the invention.

Fig. 9 is a view taken on the planes indicated by lines 9—9 of Fig. 8.

Fig. 10 is a detail view of a modified form of friction shoe.

Fig. 11 is a detail horizontal sectional view showing the central friction member connected to a coupler shank of the swivel butt type.

Fig. 12 is a vertical sectional view of the construction shown in Fig. 11.

Fig. 13 is a horizontal sectional view through one of the arms of a tool employed for assembling the gear.

Referring to the drawings there are shown at 2, 2, the customary draft sills, which are fastened underneath the car in the usual way. Secured to said sills are forward draft lugs 3, 3, and backstop casting 4, providing a pocket for the reception of a draft gear.

The draft gear embodying my invention and shown in Figures 1–5 comprises a central friction member 5 and a spring 6 surrounding the same. Engaged with said friction member adjacent the forward end thereof is a pair of friction shoes, 7, 7. Each of said shoes includes a portion 7', extending longitudinally within the spring 6 and having an arcuate inner surface engaging the friction member. Each shoe 7 further comprises a forward head portion 8 projecting laterally and vertically (Fig. 3) with respect to portion 7' and engageable by the front end of the spring 6, and a vertical rib or projection 9 extending forwardly from said portion 8 for engagement with a corresponding one of the draft lugs 3. Another pair of shoes 10, 10 engage the friction member 5 adjacent the rear end thereof; each of these shoes comprising a longitudinally extending portion 10' within the spring 6, and having an arcuate inner surface engaging said friction member, a laterally and vertically projecting head portion 11 engageable by the rear end of said spring, and a vertical rib 12 on the rear face of said portion 11 for engagement with a corresponding one of the lug portions 13, 13 of the casting 4. The pairs of shoes 7, 7 and 10, 10, in short, frictionally engage the forward and rearward portions, respectively, of the central friction member, and are in turn engaged by opposite ends of the spring 6. They are also fulcrumed at opposite ends of said spring. It will be observed in this connection that the shoes are provided with rounded portions 14 and that the ends of the spring 6, instead of being rectangular in cross section as in the customary practice, are rounded at 15 for cooperation with the portions 14 of the associated shoes.

Also, it is to be noted that the ribs 9 and 11 of the respective shoes are each curved or rounded transversely as shown clearly at 16 in Fig. 1. With this construction, as a shoe becomes worn,

and its end within the spring 6 tends to move toward the centerline of the gear, the point of engagement between the rib and the draft lug is maintained close to the sill 2 and the pressure is transmitted from the shoe at a more advantageous point than would be the case if the face on said rib were flat.

The radius of curvature of the rounded portion 14 of each shoe is slightly greater than that of the cooperating curved portion of the spring 6. In this way desirable free action of the shoes is permitted, said difference in radii enabling clearance to exist between the outer surfaces of portions 7' or 10' of the shoes and the inner surface of the coils of the spring; while at the same time the spring, through its engagement with the shoe portions 14, tends to wedge the shoes constantly toward the center of the gear, thus providing for contact between the friction surfaces on the shoes and friction member 5 over the entire length of said friction surfaces of the shoes. By way of example, it may be noted that in the embodiment illustrated, wherein the radius of curvature of the coils and also of the rounded portions 15 of the ends of the spring is 1⅝", a radius of curvature of 1$\frac{3}{16}$" for the rounded shoe portions 14 has been found quite satisfactory.

The centerline of the force transmitted longitudinally by the spring to a pair of the shoes at one side of the longitudinal axis of the gear is indicated approximately by the line designated 17. The distance between lines 17 and 36 represents the eccentricity between the force exerted on the shoes by the spring and the reaction set up by the draft lug, which eccentricity causes the shoes to be rotated to grip the friction member. The centerline 17, and thus the point of application of the force to the shoes may be varied to increase or decrease the eccentricity by cutting back the shoes, as illustrated, for example, at 18 in connection with one of the shoes 7 in Fig. 10.

It will be seen that the head 19 of the central friction member extends adjacent the edges of the front draft lugs 3, 3, and that the latter serve as lateral guides for said member. Also it may be observed that the radius of curvature of the surface 20 of each of the front shoes 7 is considerably greater than that of surface 21 of the rear shoes. The larger radius for the surfaces 20 enables the provision of an increased quantity of metal in the head of the member 5 to provide a stronger connection between the head and shank. The smaller radius in connection with surfaces 21 of the rear shoes enables the provision of flat surfaces 22 thereon for cooperation with a similar surface on the rear projection 24 of the central friction member, whereby spreading apart of said shoes in draft is prevented. Flattened portions 25 of the shoes 7 in cooperation with corresponding flat surfaces on the friction member head 19 prevent spreading of these shoes under buff.

At its front end the central friction member 5 is provided with means for attachment of said member directly to a coupler. In the form shown in Figs. 1, 11, and 12, said friction member is adapted for connection to a coupler of the so-called "swivel-butt" type; for which purpose the head 19 of said member may have two pairs of vertically spaced flanges or lugs 26 with curved forward edges, and each provided with an opening 27 for the reception of a vertical pivot pin 28. The coupler shank 29 is of a well known swivel butt construction having lugs 30 with curved rear edges, and also having upwardly and downwardly extending flanges 31, 32 provided with curved faces. Lugs 30 are received between corresponding pairs of the friction member lugs 26 and are apertured for the reception of the pivot pin 28. A horizontal key 33 extends through slots in the coupler shank and also through the customary slots 34 in the draft sills, said horizontal key also engaging within a slot 35 in the vertical pin 28. The portions of the coupler shank above and below the horizontal key are curved for cooperation with the corresponding curved edges of the two intermediate lugs 26, while the head of the friction member similarly has curved surfaces between the lugs 26 of the upper and lower pairs for cooperation with the curved rear edges of the coupler shank lugs 30. The curved front edges of the uppermost and lowermost lugs 26 cooperate with the curved rear faces of the coupler flanges 31, 32 respectively. As will be readily understood, with this construction the draft stresses are transmitted from the coupler shank through the vertical pin to the central friction member 5, while buffing stresses are transmitted from said shank to said friction member through the curved rear surfaces on the shank and the cooperating curved forward surfaces on the friction member. At the same time relative swiveling movement between the coupler shank and friction member may readily take place about the vertical axis of the pin 28.

While one form of attachment between the friction member and coupler shank has been above described, the friction member may be modified for connection to other types of coupler shanks by any other suitable or conventional means. Since in my draft gear the coupler is connected directly to the friction member, my invention eliminates the necessity of yokes and their attendant followers.

It will be seen that in draft the front shoes 7, 7 are held against longitudinal movement by the front draft lugs 3, while friction is developed between said front shoes and friction member 5. The rear shoes 10 are pulled forward by the friction member and thus no sliding movement takes place between these shoes and said friction member in draft. In buff, on the other hand, friction is developed between the rear shoes 10 and the friction member 5, said rear shoes being held against movement and the front shoes moving with the friction member. Thus the front and rear shoes act alternately in draft and buff to develop friction, with resultant distribution of wear on the friction parts between the two ends of the gear.

The draft gear illustrated in Figure 1 was given the equivalent of twenty-four American Railway Association sturdiness tests, and at the end of this extremely harsh treatment it was found that the amount of wear and shortening had not exceeded the A. R. A. limitations. The spring 6 was shortened only slightly and its action not at all impaired, notwithstanding the fact that the gear goes solid on said spring. The spring 6 utilized in conjunction with these sturdiness tests had a wire diameter of 3¼ inches, a free height of 19⅞ inches, a solid height of 17 inches, and an inside diameter of 6 inches. Said spring, when assembled in the draft gear with the shoes and friction member in the normal or released condition shown in Figure 1, is under an initial compression of ¼ inch, and provides an initial pressure of 11,304 pounds. When the gear illustrated is compressed to its maximum extent, i. e., 2⅝ inches,

the spring pressure is approximately 130,000 pounds, and the cushioning capacity of said spring is approximately 15,000 foot pounds as compared with a total capacity of about 20,000 foot pounds for the entire draft gear. Thus, about ¾ of the capacity of the gear is provided by the spring itself, and ¼ by the friction generating surfaces. The wire diameter aforesaid is far greater than that heretofore employed in draft gear springs. The wire diameter of conventional draft gear springs rarely exceeds 1¼ inches, and I am aware of no draft gear spring, the wire diameter of which has approached that of the spring above referred to.

The ability of my draft gear spring to withstand successfully the heavy oversolid blows to which it was subjected in the sturdiness tests was unexpected and contrary to draft gear practice, in which connection I wish to note that the American Railway Association does not permit the taking of oversolid blows on draft gear springs, which, in the case of springs used in ordinary draft gears, is a necessary provision. I attribute the performance of my spring mainly to its extremely large wire diameter and consequent great capacity. Also, the ratio of the outside diameter (12½ inches in the spring above referred to) to the length of the spring is such as to give the spring good performance as a column. This results in assurance against collapsing, as well as against slipping sidewise, of one coil with respect to another, under oversolid stresses, with consequent marked stability of the spring. Furthermore, it is believed that the performance of the spring **6** in acceptably surviving the severe tests aforesaid is due to some extent to the fact that apparently, not all parts of said spring go solid simultaneously and to the resiliency provided by the spring while being compressed solid. More particularly, it appears that when the spring is going solid, portions of adjoining coils first engage each other with a line contact and are then flattened slightly into a surface engagement as the pressure continues. Upon relaxing of said pressure the flattened surfaces resume their normal shape. In other words, resiliency exists even after the coils are first brought into contact with each other, and the spring provides sufficient deflection to prevent undesirable rapid increase in pressure as the gear goes solid. The spring **6** is found able to withstand the highest pressures developed in service without having its characteristics as a spring impaired.

The centerline of reaction of the shoes on the draft lugs at one side of the longitudinal axis of the gear is indicated by the line designated **36**. At all points up to that at which the gear commences to go solid the eccentricity between said centerline of reaction and the centerline of the force of the spring against the corresponding shoes remains constant, but, as the gear proceeds to go solid on the spring the centerline of force of the spring on said shoes shifts to the center of the wire, wherefore the eccentricity aforesaid is materially reduced. In other words, as the spring goes solid the force is transmitted to the draft lugs more nearly in line with the line of reaction of the shoes against said lugs, and consequently any tendency toward bending of the shoes is substantially diminished. Also, it may be noted that the only unsupported portion of the central friction member is that between the inner ends of the two pairs of shoes, and that the portions of said member engaged by said shoes is effectively supported as a result of the constant forcing of the shoes inwardly under the action of the spring. Buckling of said central friction member is thus counter-acted and a structure of pronounced rigidity, highly effective in resisting buffing stresses, is attained.

In ordinary draft gears there is practically no snubbing on release, due to the desire to avoid the possibility of sticking of the gear. In my draft gear, however, sticking is practically impossible, as a result of the high capacity of the spring, as well as of the absence of any wedge or housing tending to maintain the friction surfaces in tight contact when the pressure is released. Also, the low unit bearing pressure of the friction shoes on the friction member contributes to ready release. Since only approximately one-fourth of the capacity of the gear illustrated is due to friction, the forces exerted on the friction surfaces are considerably less than in conventional gears, and since the friction surfaces are comparable in area to those in gears of conventional type, the force per square inch between the shoes and friction member is less than that in conventional draft gears. During release of my draft gear, the shoes, through which friction was generated in compression, remain pressed against the friction member **5** under the influence of the spring **6**, with consequent advantageous snubbing of the spring recoil, thus preventing excess recoil forces from being transmitted to the coupler shank and thence to the adjacent car.

A particularly convenient method of assembling the gear is illustrated in Figures 6 and 7. The friction member **5** is first stood in an upright position between the pair of blocks **37**, **37**, and the shoes **7**, **7**, applied thereto with their ribs **9** engaging the tops of said blocks. Then the spring **6** is slid over said friction member and into engagement with said shoes. A tool **38** having arms **39**, **40** is placed on top of the spring and is then subjected to the action of a press or static machine of conventional type having a movable cross head **41** whereby downward pressure is applied to the tool **38** and the spring **6** is compressed. The rear shoes **10** are then applied as illustrated, with their longitudinal portions **10'** inserted between the spring and the central friction member. Each of said shoes **10** is provided with a recess **42** which permits the shoe during assembly to move outwardly a sufficient distance to permit it to slip between the points **43** and **44** without interference with the spring. Through the provision of said recess moreover, the shoe can be made considerably longer than would otherwise be possible and a substantial area is thus added to the friction generating surfaces. As will be clear from Figure 2, the head portions **11** of the shoes **10** are cut away at **45** to provide tapered pockets therebetween. The arms **39**, **40** of the tool **38** are, as shown in Figure 13, correspondingly tapered inwardly toward the center of the gear and are adapted to fit into the pockets aforesaid. By tapering said arms as aforesaid a particularly rigid column structure is provided, and bending of the tool while compressing the spring is prevented. After both rear shoes **10** have been slipped into place the cross-head **41** is released and said shoes engage the head **19** of the friction member as in Figure 1. The front shoes are also shown (Fig. 3) with cut-away portions **46** in their head portions **8**, providing tapered recesses, but such may be omitted if desired.

It will be noted that when assembled the gear requires no bolts or tie-rods for holding it in assembled position. The spring effectively maintains the shoes in position on the friction member.

Clearance is provided at 47 (Figs. 2 and 3) between the shoes of each pair. As the friction surfaces wear, the clearance will be reduced, but even if after prolonged and severe wear the shoes should ultimately come together the gear will nevertheless remain effective to afford substantial protection to the car. This follows from the high capacity of the spring 6, together with the fact that it is impossible for the elements of the gear to fall apart even after long continued wear.

If desired the central friction member 5 may be extended at its rear end as shown at 55 so as to engage the surface 48 of the back stop casting 4 as the gear goes solid. In this way part or all of the oversolid blows may be transmitted to the car structure through the back stop.

In Figures 8 and 9, there is shown a modified form of my invention wherein only spring action is provided in draft and combined spring and friction action in buff. It will be seen that the front shoes of Figure 1 are omitted in Figure 8. A follower 50 may be included for engagement by the front end of spring 6'. The friction member 5' in this form of the invention has lugs 51 on the rear portion thereof, which lugs extend between the rear shoes 10, 10 and prevent the latter from rotating about the longitudinal axis of the gear. These lugs may be cast integral with said friction member and are tapered as at 52 to provide clearance for permitting rocking of the shoes 10 about the curved engaging surfaces of the spring. The forward portion of the friction member 5' is reinforced by ribs 53 to provide greater strength. The spring 6' may have the usual flattened or rectangular formation in one of its end portions, for engagement with follower 50, as indicated at 54.

Since oversolid blows are taken on the spring 6, the travel of the gear is determined by the difference between the free and solid height of said spring. Liberal tolerance as to solid heights of springs provided for draft gears of this type may be allowed and at the same time the desired gear travel maintained if there be kept on hand a series of followers, such as 50, of different thicknesses. Any differences in the distance between adjacent coils due to variation in solid height of springs may thus be overcome by selection of a follower of appropriate thickness, and the desired length of travel of the gear may thereby be preserved.

It will be noted that my invention by eliminating any form of yoke for connection with the draft gear, does away with previous limitations on the size of spring that can be used in the standard draft gear pocket. In my construction, the spring extends into the spaces which ordinarily would be occupied by the yoke arms enabling utilization of the entire width and height of the draft gear pocket.

The terms and expressions which I have employed are used as terms of description and not of limitation, and I have no intention, in the use of such terms and expressions, of excluding any equivalents of the features shown and described or portions thereof, but recognize that various modifications are possible within the scope of the invention claimed.

I claim:

1. In a draft gear, a friction member, a spring surrounding said member, and friction shoes comprising angularly disposed arms fulcrumed at the junction of said arms on opposite ends of said spring, said shoes engaging said friction member.

2. In a draft gear, draft lugs having a shoe engaging surface substantially perpendicular to the longitudinal axis of said draft gear, a friction member, a pair of friction shoes disposed on opposite sides of said member, a second pair of friction shoes disposed on opposite sides of said member, each of said shoes engaging the friction member at one end and a draft lug at the other end and having a curved spring engaging portion intermediate said ends, a spring engaging said portions of said pairs of shoes at its opposite ends and providing a fulcrum for each of said shoes.

3. In a draft gear, draft lugs having a shoe engaging surface substantially perpendicular to the longitudinal axis of said draft gear, a friction member, a pair of friction shoes disposed on opposite sides of said member, a second pair of friction shoes disposed on opposite sides of said member, and a spring engaging said pairs of shoes at its opposite ends, each of said shoes engaging said friction member at one end and a draft lug at the other end and having a rocking engagement with said spring.

4. In a draft gear, a friction member, shoes engaging said member, each of said shoes having a portion intermediate the ends thereof rounded about an axis transverse to the draft gear, and a spring having rounded portions in engagement with the respective rounded portions of said shoes.

5. In a draft gear, a friction member, shoes engaging opposite sides of said member, each of said shoes having a portion intermediate the ends thereof rounded about an axis transverse to the draft gear, and a spring surrounding said member and having rounded portions in engagement with the respective rounded portions of said shoes.

6. In a draft gear, a friction member, shoes engaging opposite sides of said member, each of said shoes having a portion intermediate the ends thereof rounded about an axis transverse to the draft gear, and a spring surrounding said member and having rounded portions in engagement with the respective rounded portions of said shoes, the rounded portions of said spring each having a radius of curvature slightly smaller than that of the rounded portion of the shoe engaged thereby, the rounded spring portions thereby forming fulcrums for said shoes.

7. In a draft apparatus, draft sills, a friction member, a spring surrounding said member and extending across substantially the width and height of the space between said sills, a pair of front draft lugs, a set of friction shoes engaging opposite sides of said friction member and abutting said draft lugs, a pair of rear draft lugs, and a set of friction shoes engaging opposite sides of said friction member and abutting said rear draft lugs, said spring being interposed between said sets of friction shoes, said shoes, spring, and lugs being constructed and arranged to provide for rocking said shoes about an axis intermediate the ends of said shoes.

8. In a railway draft apparatus, draft sills, a friction member, a spring extending substantially across the width and height of the space between said sills, friction shoes engaging opposite sides of said friction member and having portions ex-

tending longitudinally within said spring, said shoes also having portions intermediate the ends thereof rounded about the axis transverse to the friction member and substantially concentric with and engaged by rounded portions of one end of said spring.

9. In a railway draft apparatus, draft sills, a friction member, a spring extending substantially across the width and height of the space between said sills, friction shoes engaging opposite sides of said friction member and having portions extending longitudinally within said spring, said shoes also having portions intermediate the ends thereof rounded about the axis transverse to the friction member and engaged by correspondingly rounded portions of one end of said spring, the radius of curvature of the rounded surface of each shoe being slightly larger than that of the portion of the spring in engagement therewith, the rounded spring portions thereby forming fulcrums for said shoes.

10. In a railway draft apparatus, draft sills, a friction member, a spring surrounding said friction member and extending substantially across the width and height of the space between said sills, draft lugs, friction shoes engaging said friction member and having portions extending longitudinally within said spring, said shoes having rounded portions engaging said draft lugs.

11. In a railway draft apparatus, draft sills, a friction member, a spring surrounding said friction member and extending substantially across the width and height of the space between said sills, draft lugs, friction shoes engaging said friction member and having portions extending longitudinally within said spring, said shoes having rounded portions engaging said draft lugs, said shoes also having rounded portions engaged by rounded portions on an end of said spring, and means providing an abutment for the opposite end of said spring.

12. In a railway draft apparatus, draft sills, a friction member, a spring extending substantially across the height and width of the space between said sills, friction shoes engaging said friction member and engaged by one end of said spring, means providing an abutment for the opposite end of said spring, draft lugs and rounded portions on said shoes engaging said lugs.

13. In a railway draft gear, a friction member, friction shoes engaging said member and having rounded portions, spring means having rounded portions engaging the rounded portions of said shoes, stop means and other rounded portions on said shoes engaging said stop means.

14. In a railway draft gear, a friction member, friction shoes engaging said member and having rounded portions, spring means having rounded portions engaging the rounded portions of said shoes, stop means and other rounded portions on said shoes engaging said stop means, the radius of curvature of the portions of the spring means engaging the rounded portions of said shoes being less than the radius of curvature of said rounded shoe portions.

15. In a draft gear, a friction member, a pair of shoes engaging opposite sides thereof, a second pair of shoes engaging opposite sides thereof, a spring surrounding said member and engaging the respective pairs of shoes at its opposite ends, draft lugs engaged by the rounded portions of the respective shoes, said friction member having a head at its forward end, and the shoes of one of said pairs having rounded portions engaging correspondingly rounded portions of said member adjacent said head, said friction member also having an abutment at its opposite end, and the shoes of the other pair having rounded portions engaging said friction member adjacent said abutment, the last mentioned rounded portions each having a radius of curvature less than that of the rounded portions of the other pair of shoes in engagement with said portion of the friction member adjacent said head.

16. In combination, a friction member, a spring surrounding said member, friction shoes between said friction member and said spring, and engaged thereby, said friction member being shaped to hold said shoes and spring in assembled position, and said shoes having portions extending longitudinally within said spring and portions extending laterally from said friction member, said longitudinally extending portions being longer than said laterally extending portions and having recesses therein on the outer side thereof enabling rotative assembly of said shoes within said spring and into engagement with said friction member.

17. In a draft gear, a friction member, a spring surrounding said friction member, friction shoes engaging said member and having portions extending longitudinally between said friction member and said spring, an end of said spring being rounded about an axis transverse to said draft gear and providing a fulcrum for each of said shoes, said friction member having portions extending laterally therefrom and engageable by said shoes for limiting movement thereof.

18. In a railway draft apparatus, a friction member, a spring surrounding said friction member, shoes engaging said friction member and engaged by said spring, and draft lugs, said shoes having rounded portions engaging said draft lugs.

19. In a railway draft apparatus, a friction member, a spring surrounding said member, shoes engaging said member and engaged by said spring, said shoes having portions extending longitudinally within said spring, and draft lugs, said shoes having rounded portions engaging said draft lugs.

20. In a draft gear, a friction member, a spring surrounding said friction member, shoes engaging said friction member, draft lugs, said shoes having rounded portions engaging said draft lugs, said shoes also having rounded portions engaged by rounded portions of an end of said spring, and means providing an abutment for the opposite end of said spring.

21. In a draft gear, draft lugs, a friction member, shoes in engagement with opposite sides of said member, a spring surrounding said friction member, said shoes having portions extending longitudinally within said spring and in engagement with said friction member, and also having head portions extending laterally with respect to said longitudinal portions and bearing against portions of said draft lugs substantially perpendicular to said friction member, each of said shoes also comprising a surface engaged by said spring for receiving a longitudinal thrust the center line of which is applied to said shoe at a point between said friction member and the center line of reaction of said shoe against said draft lug.

22. In a draft gear, draft lugs, a friction member, a spring surrounding said friction member, rockably mounted shoes having portions extending longitudinally within said spring and in engagement with said friction member, and also having head portions extending laterally with respect to said longitudinal portions and bearing against portions of said draft lugs substantially

perpendicular to said friction member, said spring engaging a portion of each of said shoes extending at an angle to the longitudinal axis of the gear for enabling said spring to exert a force upon said shoes both longitudinally and transversely of said friction member.

23. In a draft gear, draft lugs, a friction member, shoes in engagement with opposite sides of said friction member, said shoes having portions extending longitudinally within said spring and in engagement with said friction member, and said shoes also having head portions extending laterally with respect to said longitudinal portions, and each provided with a rounded projection bearing against a corresponding one of said draft lugs, each shoe also having a rounded portion engaged by a rounded portion of said spring and having a radius of curvature different from that of said rounded spring portion.

24. In a railway draft apparatus, a friction member having outwardly extending lateral projections at each end, a spring surrounding said member, and shoes arranged with portions thereof between each end of said spring and said lateral projections to provide the sole means for maintaining said parts in assembled relation.

25. In a draft gear, draft lugs, a friction member having laterally extending portions at one end thereof, shoes frictionally engaging opposite sides of said friction member, said shoes having laterally extending arms adapted to abut the lateral extensions of said friction member and said draft lugs and a spring surrounding longitudinal portions of said friction member and said shoes, and urging said shoes into engagement with said lateral extensions of the friction member

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