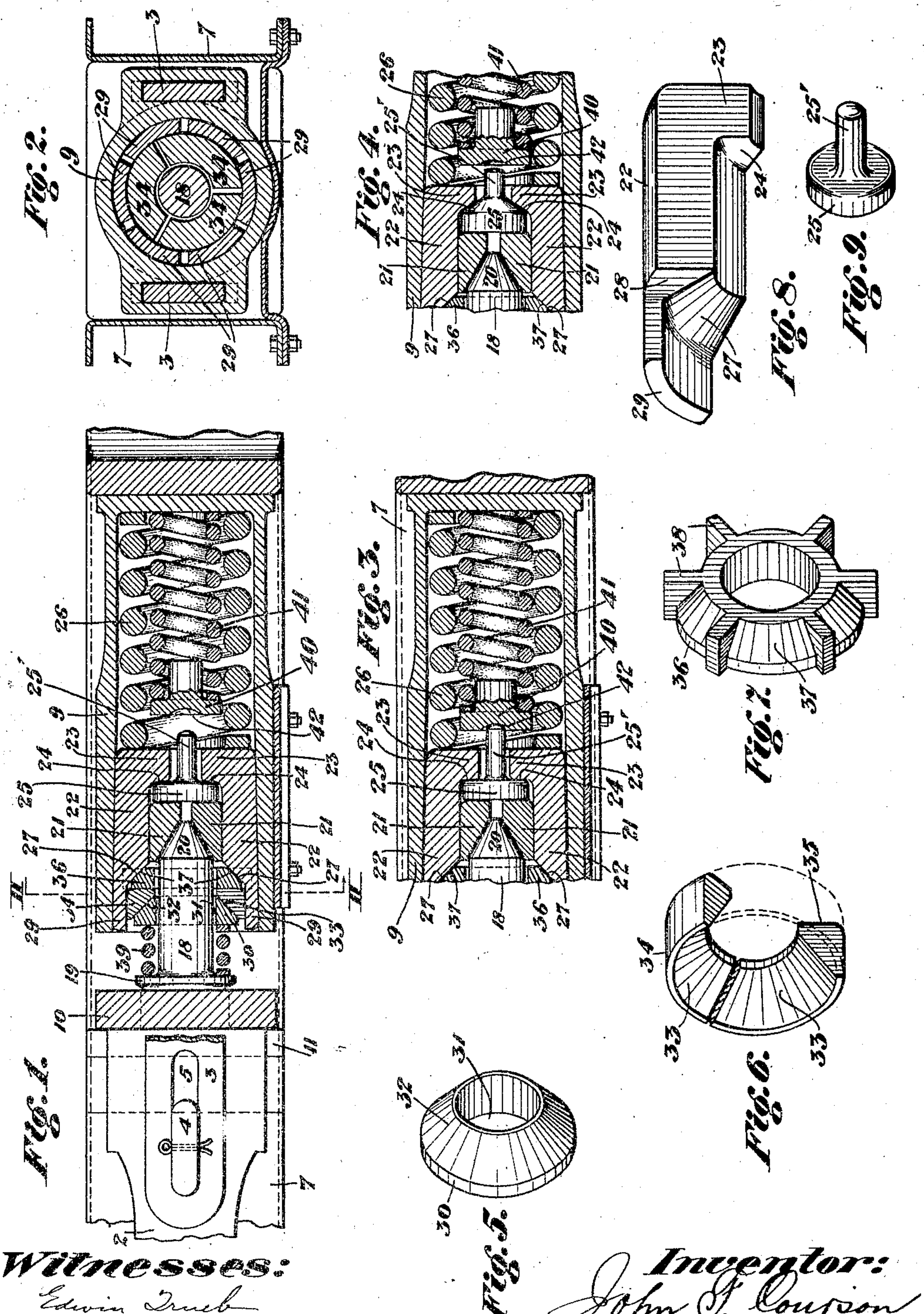
J. F. COURSON.

DRAFT GEAR.

APPLICATION FILED DEC. 15, 1915.

1,237,754. Patented Aug. 21, 1917.

2 SHEETS—SHEET 1.



Witnesses:

Edwin Trueb

Wasdeleman

Inventor:

John F. Courson

by C. M. Clarke

atty.

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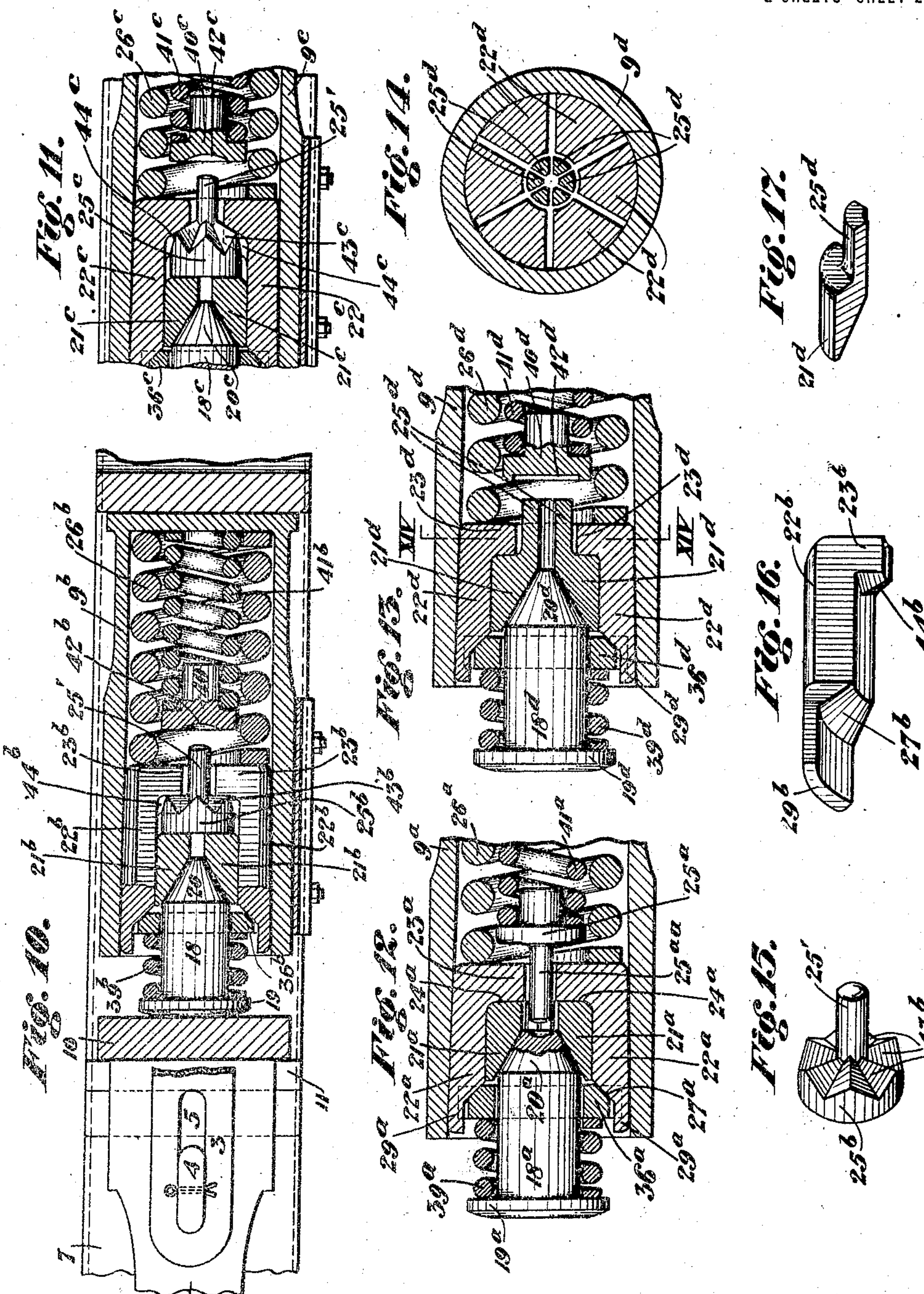

Witnesses:

Edwin Trueb

W. A. Heckman

Inventor

John F. Courson

by C. M. Clarke Atty

UNITED STATES PATENT OFFICE.

JOHN F. COURSON, OF PITCAIRN, PENNSYLVANIA.

DRAFT-GEAR.

1,237,734. Specification of Letters Patent. Patented Aug. 21, 1917.

Application filed December 15, 1915. Serial No. 66,935.

To all whom it may concern:

Be it known that I, JOHN F. COURSON, a citizen of the United States, residing at Pitcairn, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Draft-Gears, of which the following is a specification.

My invention consists of an improvement in draft gears of the general class utilizing springs and friction shoes in connection with centrally arranged expanding wedge mechanism, operable upon buffing or pulling, to effect expansion of the friction shoes within an embracing cylinder or casing.

The particular objects in view are to provide, in a gear of this type, means for effecting the resumption of the parts to normal position, the maintenance of the parts in a free open released condition when not under compressing strains, means for positioning the parts and for compensating for wear or resulting lost motion, means for providing increased frictional action between the working parts, means for applying force or resistance directly to the inner portions of the friction shoes, and various other features of advantage and construction as more fully hereinafter set forth.

The several objects in view are accomplished, in certain preferred forms of the apparatus, as more fully hereinafter described and illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal vertical sectional view through the complete gear as assembled, the parts being shown in extended position.

Fig. 2 is a cross sectional view on the line II. II. of Fig. 1.

Figs. 3 and 4 are partial sectional views, similar to Fig. 1, showing modified arrangements.

Fig. 5 is a detail view in perspective of the outer expanding collar.

Fig. 6 is a similar view of the co-acting divided friction collar.

Fig. 7 is a similar view of the inner expanding and spacing collar.

Fig. 8 is a similar view of one of the friction shoes.

Fig. 9 is a similar view of the friction block intervening between the expanding wedges and the inner flanges of the friction shoes.

Fig. 10 is a view similar to Fig. 1, showing a further modified construction.

Figs. 11, 12 and 13 are partial similar views, showing further modified constructions.

Fig. 14 is a cross sectional view on the line XIV. XIV. of Fig. 13.

Fig. 15 is a perspective detail view showing a modified construction of friction block between the expanding wedges and inner flanges of the friction shoes, as shown in Figs. 10 and 11.

Fig. 16 is a similar view of one of the friction shoes adapted to coöperate with such form of friction block.

Fig. 17 is a similar view showing a segmental section of a compound expanding wedge, as used in Fig. 13.

In the drawings, referring to Sheet 1, 2 represents the drawbar of a coupler connected with the drawbars or links 3 by a transverse bolt or key 4, which extends through slots 5 in the front portion of links 3, and through slots in the center sills 7 of the car framing at each side.

Links 3 extend rearwardly and engage the casing 9 at each side between the center sills, by any suitable connecting mechanism. A follower 10 bears forwardly against suitable front stops 11 of the center sills 7, and is supported otherwise by any suitable or necessary means providing for easy assemblage or removal.

A central wedge block or buffing pressure bar 18 bears directly against the rear central portion of follower 10 by its flange end 19, and said wedge block is provided with a terminal 20 providing an annular tapered wedge of coniform or other suitable construction, the face of which corresponds in degree of slope to the inner faces of expanding wedges 21.

Said faces, *i. e.*, 20, and inner contacting faces of wedges 21, taper inwardly toward the longitudinal center of the gear at such an angle as to produce a maximum expansion with resulting free release.

Wedges or wedge blocks 21 bear outwardly against the inner faces of a plurality of friction shoes 22 arranged in an annular series within the casing 9 and adapted to frictionally engage the inner, preferably tapered, surface thereof.

Said shoes 22 are provided at their inner

ends with inwardly disposed rear flange terminals 23 having inner bearing faces 24, against which bears the face of a pressure transmitting friction block 25, or, as shown in Figs. 12 and 13, the inner ends of the expanding wedge blocks, directly.

Faces 24, in the construction shown in Figs. 1, 3, 12 and 13, are at right angles to the longitudinal center of the gear and of the assembled friction shoes, as are also the engaging faces of the pressure transmitting friction block 25 or the directly engaging faces of the expanding wedge blocks, as in Fig. 12. The particular advantage and object of such construction is that upon the generation of expanding and actuating pressure, either inwardly of the casing 9 in buffing, or of resistance against movement of the casing 9 in pulling, the inner portions of the friction shoes 22 will be directly engaged through their inwardly extending flange portions 23.

I thus transmit to the inner portions of the friction shoes a direct pressure or resistance, independent of the pressure of resistance interposed against their outer portions, whereby to insure the imparting to the inner portions of the friction shoes, direct application of the pressure or resistance, and a resulting uniform application of frictional engagement between the shoes and the inner surface of the casing 9 at all times during buffing or pulling operations.

Main spring 26 is inserted within the rear portion of the casing 9, bearing against the rear inner end thereof, and against the rear ends of shoes 22 respectively, in a well-known manner.

Each of the segmental shaped friction shoes 22 is provided at its front portion with a wedging surface 27 across the inner end face of the shoe between the radial faces 28 thereof, which define a narrower front extension or lip 29 of the shoe beyond the space-defining faces 28 at each side, backwardly beyond which the main body portion of each shoe is practically in contacting engagement with its next adjacent one, when the gear is closed, with slight clearance, as indicated in Fig. 2.

The purpose of so providing wedge faces 27 and the narrowed front extensions 29 of the shoe in the same region, is to provide for the insertion or seating of the expanding collar, divided friction collar, and inner expanding and spacing collar respectively.

The expanding collar 30, as shown, is provided with a central opening 31, by which it fits around or over the central wedge 18, and is provided with an annular coniform wedge face 32 adapted to directly engage the annular wedge face or faces 33 of the divided friction collar 34, such wedge faces being preferably somewhat more obtuse than wedge faces 20 of the central expanding wedge and the inner wedge faces of the expanding wedges 21.

The inner face or faces 35 of divided friction collar 34 abut directly against the face of inner expanding and spacing collar 36, both collars 34 and 36 being centrally apertured for mounting around the central wedge 18.

Collar 36 is provided with an annular wedge face 37, interrupted at intervals by laterally disposed spacing projections 38, adapted to intervene between the several extensions or lips 29 of the friction shoes, whereby to maintain the several shoes in proper spaced relationship, and to provide for direct engagement by the several annular wedge faces 37, with the co-acting wedge faces 27 of the friction shoes.

Inserted between the front face of expanding collar 30 and the rear face of flange 19 of the central wedge 18 is a retracting spring 39, the purpose of which is to thrust the central wedge outwardly upon release of pressure in buffing, or to thrust the collar 30 inwardly upon release of pressure in pulling, whereby to effectually release and permit the several parts to resume their normal inoperative position.

Central wedge 18 is of the "floating" type, being unconnected with and free of restraint by any connection with the rear portion of the gear. Interposed between the inner, preferably squared, abutting ends of expanding wedges 21 and the inner faces 24 of friction shoe flanges 23, is the pressure transmitting friction block 25, having similar co-acting faces in direct intervening abutting engagement with said faces.

By this means, the direct pressure in either buffing or pulling, above pointed out, is transmitted between these parts. Likewise, initial movement of the friction shoes 22 and expanding wedges 21 toward the center of the gear, under compression strains, due to the tapering inner annular face of casing 9, effects a material frictional engagement across the end face of block 25, thereby materially amplifying the total frictional result of the gear.

In the simpler arrangement shown in Fig. 12, the friction shoes 22^a are directly engaged, by the inner faces 24^a of their terminal flanges 23^a, by the inner abutting ends of the expanding wedges 21^a, imparting direct transmission of the force longitudinally, but without any lateral frictional engagement, the expanding wedges and friction shoes moving, in such construction, inwardly or outwardly together.

Fig. 12 also shows a modified construction utilizing the single expanding and spacing collar 36^a, the directly engaging spring 39^a, and the several other parts already described, and indicated by corresponding numerals having the exponent a.

The pressure transmitting friction block 25, in so far as its function for transmitting the pressure to or from the expanding wedge blocks and friction shoes is concerned, may be merely a flat faced disk, but, as shown in Figs. 1 and 3, it is provided with the stem extension 25′. Said stem extends rearwardly and engages, or is adapted to engage, a terminal button or head 40 seated against the end of an inner spring 41, nested within main spring 26, and adapted to transmit movement and effect resulting spring resistance between stem 25′ and block 25, and button 40 respectively, said button being preferably provided with a central depression or seat 42 for engagement against the end of stem 25′.

By interposing the divided friction collar 34 between the expanding collar 30 and the inner expanding and spacing collar 36, inward movement of expanding collar 30 under pressure of spring 39 is provided for, without any resulting undue compression or crushing of spring 39. The angle or slope of wedge terminal 20 of bar 18 being more acute than the angle faces of the assembled collars 30, 34 and 36, results in the inward advancement of bar 18 in buffing, or outward movement of casing 9 and its contained parts in pulling, faster than would be the normal corresponding movement or resistance of collar 30 or 36 alone, due to the difference in degree of the wedge faces.

By interposing the divided friction collar 34, the relative speed of movement of collar 30 is supplemented or compensated for, divided collar 34 expanding under pressure and permitting collar 30 to advance inwardly, in buffing, or collar 36 to move outwardly, in pulling, or, in other words, to facilitate the approachment of said collars toward each other, by a partial lateral displacement of the intervening divided collar 34.

In the operation of the gear, due to the wear of the outer faces of the friction shoes 22, these shoes will gradually assume distances increasing from the center outwardly, and the wear of the other parts will result in the gradual advancement of the several members of the gear toward each other.

The divided collar 34 will thus tend to compensate for differences in the travel of the parts, whereby to maintain an average spacing as to spring 39 between collar 30 and terminal flange 19, so as to maintain the spring continuously in its normal condition as to length and resiliency.

The advantages of such construction result in continued efficiency of the spring 39 in effecting snug seating of the assembled collars and continuous and reliable capacity in effecting release of the bar 18 upon termination of pressure, with resulting collapse of the friction-exerting members, and the desired easy and free release after each operation.

While the principal object in providing the direct longitudinal abutting engagement between the inner ends of wedge blocks 21 and flanges 23 of friction shoes 22 is to exert an inward pull or resistance as to the inner portions of the friction shoes, with a resulting maintenance of their friction surfaces in engagement with the inner annular face of the casing 9, the intervening pressure-transmitting friction block 25 and the flanges 23 may be so constructed as to also generate added friction, by constructing the block and the inner portions of the friction shoes in the manner shown in Figs. 10, 11, 15 and 16 of the drawings.

In such construction, block 25^b abuts by its front flat face directly against the inner ends of wedge blocks 21^b, but is provided on its rear or inner face with a series of V-shaped projections providing wedge faces 43^b adapted to coact with the corresponding wedge faces 44^b of similar V-shaped projections and recesses on the inner faces of flanges 23^b of friction shoes 22^b.

These faces, for the purpose of generating additional wedging and resulting friction action, may be arranged in planes diverging radially and laterally at right angles to the general longitudinal center of the gear, as in Fig. 10, or they may be sloped backwardly, providing additional wedging action, as indicated at 43^c and 44^c, Fig. 11, the other parts of the gear being substantially the same as already described, and indicated by corresponding numerals having the exponent "b" as to Fig. 10, and the exponent "c" as to Fig. 11.

In the construction of Fig. 11, the effect of the wedge engagement between the wedge faces of block 25^c and the wedge faces of the friction shoes 22^c tends to distend the wedge shoes laterally into frictional engagement with the casing 9^c, while the same effect is secured in the construction of Fig. 10, in addition to the forwardly pulling action on the flanges 23^d of the friction shoes 22^b, in addition to the wedging action, tending to spread the inner ends of the shoes.

In Fig. 13, the construction as to the assembled wedges 21^d and their co-action with the central bar 18^d and its tapering terminal 20^d and also with the friction shoes 22^d and their flanges 23^d, is substantially the same as in the construction of Fig. 12, in that there is a direct abutting longitudinal engagement between the squared shoulders of the wedges and the said friction shoe flanges. The wedges 21^d comprise an assembled series of segmental sections, one of which is illustrated in Fig. 17, and each of which is provided with a forwardly extending segmental stem 25^d adapted, with its assembled companion stems, to provide a composite stem which

projects beyond the inner face of the friction shoes and provides a terminal abutting bearing for the cap 40^d of spring 41^d.

In the several constructions illustrated in Figs. 10, 11, 12 and 13, I have utilized the single expanding and spacing collar 36^b, 36^c, 36^e and 36^d respectively, similar to collar 36, Fig. 7, engaging the end wedge faced portions of the several friction shoes by its inner faces, and providing a bearing for the inner end of releasing spring 39^b, 39^a, or 39^d, respectively, which in turn engages by its other end the terminal flange of the central expanding bar, as described.

In Fig. 12 I also show a modified arrangement of the spring-actuated releasing mechanism for the inner end of the central bar, in which the pressure button 25^a is seated against the forward terminal of inner spring 41^a, and is provided with a central forwardly projecting pin 25^{aa} adapted to abut against the preferably recessed terminal of the wedge end 20^a of bar 18^a.

In the several arrangements of such releasing mechanism, I provide a cushioning resistance for the said wedge bar, either directly against it, or through the intervening wedge blocks, by means of which the central independent spring 41, *et seq.*, is compressed at any desired stage of the operation of the gear, and which will re-act at the termination of the strain, with sufficient force to effect release of the central wedging mechanism.

The degree of pressure and the time of its generation may be readily controlled by varying the proportions of the parts, the distance between the contacting elements, or otherwise, whereby to insure ample resisting and releasing action, depending upon the design, capacity, or other qualities of the gear itself.

The invention will be readily understood, as to its construction and operation, from the foregoing description.

The action of the gear in insuring constant maintenance of the desired relative location and position of the co-acting parts, compensation for any lost motion or wear of the several parts, and the desirable prompt and free release of the gear, is greatly facilitated.

It is comparatively simple in construction, composed of few parts, not liable to get out of order, and is capable of generating a very high resistance to the various shocks incident to train service.

The invention may be variously changed or modified in construction or detail arrangements by the skilled mechanic, but all such changes are to be considered as within the scope of the following claims.

What I claim is:

1. In a draft gear, the combination of a casing, friction shoes therein, a central expanding wedge, a drawbar, a plurality of co-acting wedging collars between the friction shoes and the expanding wedge, and a spring engaging the outermost of said collars and the expanding wedge.

2. In a draft gear, the combination of a casing, friction shoes therein, a central expanding wedge, a drawbar, a plurality of co-acting integral and divided wedging collars between the friction shoes and the expanding wedge, and a spring engaging the outermost of said collars and the expanding wedge.

3. In combination with the friction shoes having expanding wedge faces and a central expanding device; of a plurality of co-acting wedging collars operable against said wedge faces by the innermost of said collars, and a spring engaging the outermost of said collars and the central expanding device.

4. In combination with the friction shoes having expanding wedge faces and a central expanding device; a plurality of co-acting integral and divided wedging collars operable against said wedge faces by the innermost of said collars, and a spring engaging the outermost of said collars and the central expanding device.

5. In a draft gear, the combination of a casing, friction shoes therein, a central expanding wedge, a drawbar, a plurality of co-acting wedging collars between the friction shoes and the expanding wedge having a freely releasable wedging action and capable of inward travel at the same rate as that of the central expanding wedge, and a spring engaging the outermost of said collars and the expanding wedge.

6. In friction draft gear the combination with the casing and the relatively movable drawbar, of friction shoes engaging the casing having inwardly extending end portions provided with front bearing faces transverse of the longitudinal center of the gear, a central wedge, and expanding wedges between the central wedge and the friction shoes having rear similarly transverse bearing faces adapted to transmit pressure directly toward the front faces of the inwardly extending end portions of the friction shoes.

7. In a friction draft gear, the combination with the casing and the relatively movable drawbar, of friction shoes engaging the casing having inwardly-extending end portions provided with transverse confronting faces substantially at right angles to the longitudinal center of the gear, a central wedge, expanding wedges between the central wedge and the friction shoes, and a pressure transmitting block between the ends of said expanding wedges and said inwardly extending end portions of the friction shoes having additional front and rear transverse

faces confronting the faces of the expanding wedges and of said end portions, respectively.

8. In a friction draft gear, the combination with the casing and the relatively movable drawbar, of friction shoes engaging the casing having inwardly extending end portions, a central wedge, expanding wedges between the central wedge and the friction shoes and adapted to transmit pressure directly toward and substantially at right angles to the inwardly extending end portions of the friction shoes, and a spring arranged to exert releasing resistance against said interior wedge mechanism.

9. In a friction draft gear, the combination with the casing and the relatively movable drawbar, of friction shoes engaging the casing having inwardly extending end portions, a central wedge, expanding wedges between the central wedge and the friction shoes, and a pressure transmitting block between the ends of said expanding wedges and said inwardly extending end portions of the friction shoes having an extended stem, and a spring adapted to exert pressure against said stem to oppose binding action of said interior wedge mechanism.

10. The combination with friction shoes of a draft gear having interior wedge faces, expanding wedge mechanism therefor embodying a central wedge, and a releasing spring engaging said central wedge; of an inner expanding collar engaging the wedge faces of the shoes, an outer expanding collar engaging the spring, and an intervening friction collar.

11. The combination with friction shoes of a draft gear having interior wedge faces, expanding wedge mechanism therefor embodying a central wedge, and a releasing spring engaging said central wedge, of an inner expanding collar engaging the wedge faces of the shoes, an outer expanding collar engaging the spring, and an intervening friction collar, said collars having wedge faces less acute than the wedge faces of the central wedge.

12. The combination with friction shoes of a draft gear having interior wedge faces, expanding wedge mechanism therefor embodying a central wedge, and a releasing spring engaging said central wedge; of an inner expanding collar engaging the wedge faces of the shoes, an outer expanding collar engaging the spring, and an intervening divided friction collar.

13. The combination with friction shoes of a draft gear having interior wedge faces, expanding wedge mechanism therefor embodying a central wedge, and a releasing spring engaging said central wedge; of a plural member expanding and friction collar mechanism engaging the wedge faces of the shoes and the spring respectively and operable with relation to the friction shoes at the same rate of inward travel as the central wedge.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

JOHN F. COURSON.

Witnesses:
W. A. HECKMAN,
C. M. CLARKE.