A. L. STANFORD.

DRAFT GEARING.

APPLICATION FILED FEB. 4, 1911.

1,002,772.

Patented Sept. 5, 1911.

2 SHEETS—SHEET 1.

Fig. 1.

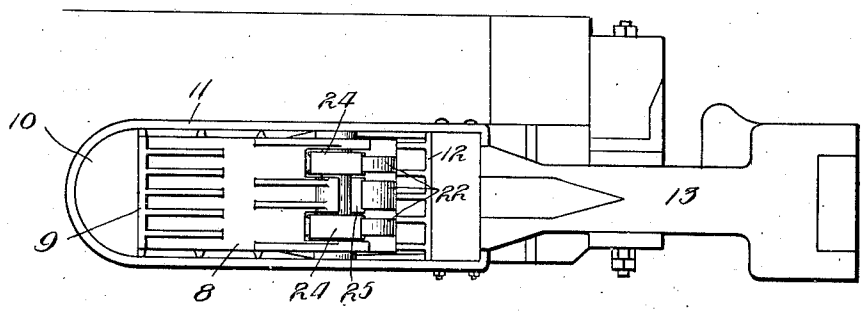


Fig. 2.

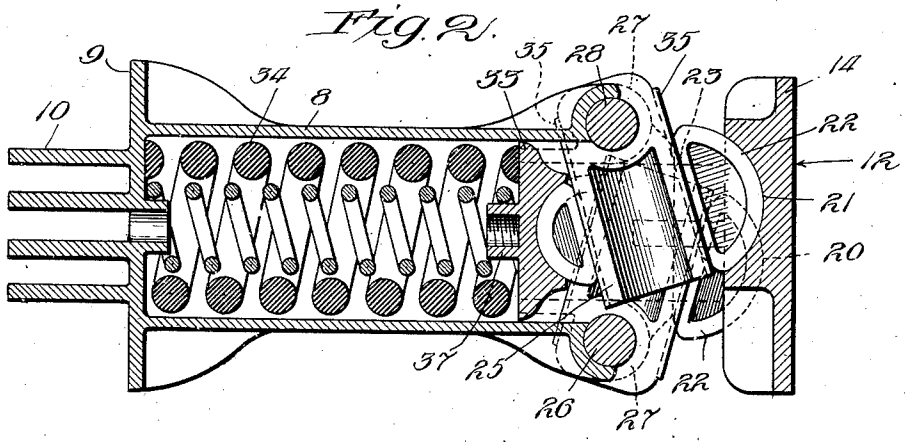
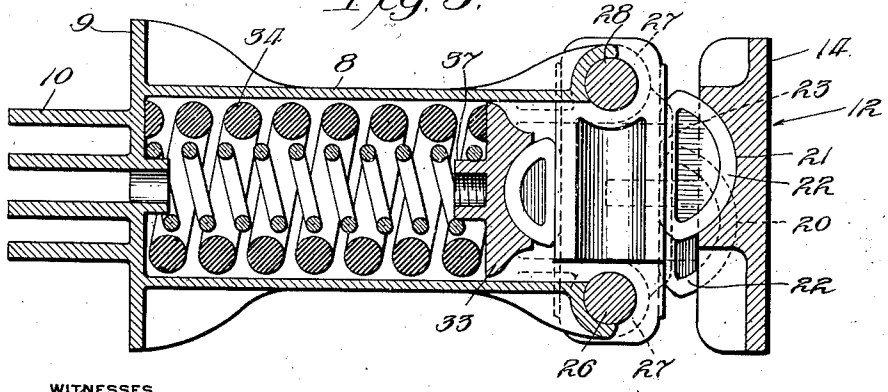


Fig. 3.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 4.

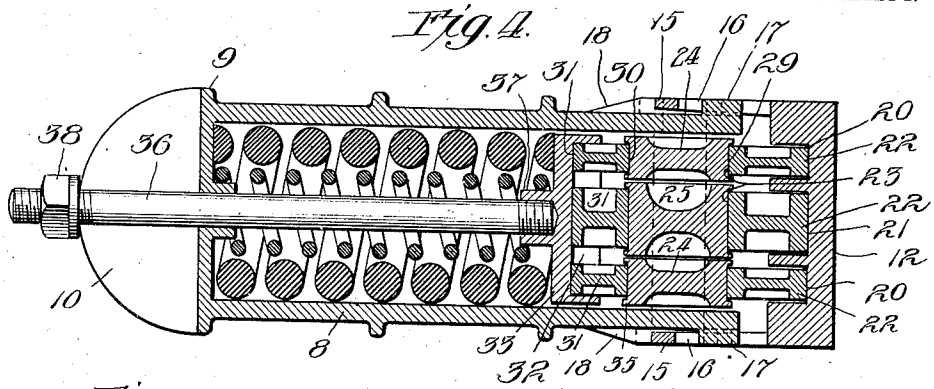


Fig. 5.

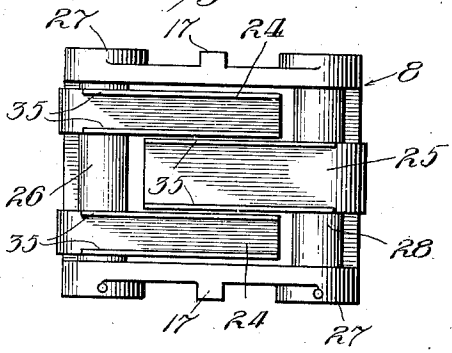


Fig. 6.

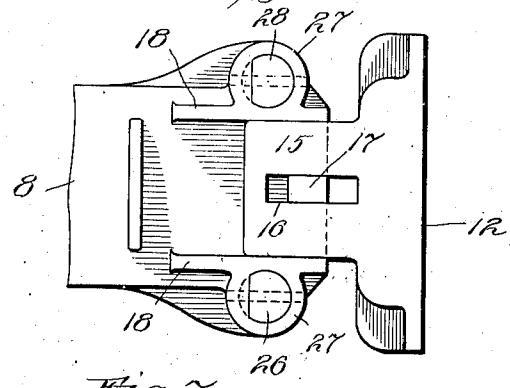
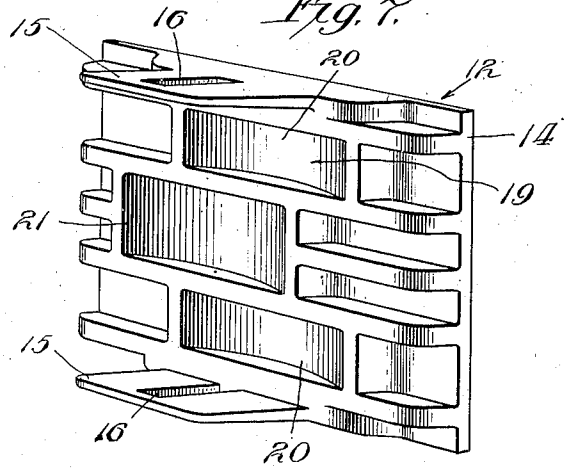


Fig. 7.



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UNITED STATES PATENT OFFICE.

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DRAFT-GEARING.

1,002,772. Specification of Letters Patent. Patented Sept. 5, 1911.

Application filed February 4, 1911. Serial No. 606,534.

To all whom it may concern:

Be it known that I, ARTHUR L. STANFORD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Draft-Gearing, of which the following is a specification.

The present invention relates to a draft gear of the type disclosed in Letters Patent No. 927,382, granted to me July 6, 1909; No. 927,383, granted to me July 6, 1909; and No. 954,058, granted to me April 5, 1910, all for draft gears.

The present invention embodies certain changes in the structures described in the above named patents; and has for one of its objects, to eliminate the outer coil-springs shown in these patents, which were intended to absorb the lighter shocks, and to utilize the outer follower plate to which the draw-bar is connected as a portion of the friction devices of the draft gearing.

Another object of the invention is to eliminate the use of an inner rod for the purpose of maintaining the initial compression upon the springs of the draft gear, and to utilize the outer follower for the purpose of maintaining this initial compression of the springs.

Further objects of the invention are, to form the inner and outer friction blocks, which compose a portion of the friction devices, of a size and to so position them with respect to the swinging arms composing another portion of the friction devices, as to obtain an efficient absorption of the shock, and at the same time decrease the cost of manufacture of these parts; to provide the swinging arms which coöperate with the friction blocks with flanges along their longitudinal edges, which form guide members to prevent transverse slippage between the arms and blocks during the operation of the gearing; and to provide means for positively locking the outer follower or cap plate to the body of the casing, so as to prevent its removal therefrom, and at the same time permit of a sliding movement between the cap plate and the casing, so that the cap plate may readily adjust itself to the inner and outer movements which it necessarily undergoes during the operation of the gearing.

The invention further relates to the features of construction and the combination of parts hereinafter described and claimed.

In the drawings, Figure 1 is an elevation showing the draft gearing of the present invention applied to a car structure; Fig. 2, a section on a somewhat enlarged scale, showing the gearing appliances in their normal position; Fig. 3, a view similar to Fig. 2, showing the appliances in the position they assume when half-way compressed by the force of a shock; Fig. 4, a section taken at right angles to the section shown in Fig. 3, and showing the method of using the rod for placing the spring under its initial compression; Fig. 5, a detail elevation of the swinging arms and the pins upon which they are mounted; Fig. 6, a detail showing the end of the casing and the method of joining the outer follower or cap plate thereto; and Fig. 7, a perspective of the outer follower or cap plate.

It is understood that the device of the present invention is based upon the same principle of operation as the device shown in my Letters Patent heretofore referred to. This principle briefly stated consists in the utilization of a plurality of sliding blocks and a plurality of swinging arms, the blocks being positioned upon opposite sides of the arms. When the appliance is subjected to the force of a shock, the blocks will move the arms about their pivot center. This will cause the blocks to slide upon the surface of the arms, as well as to slide within their respective bearings. Thus, a double frictional engagement will result, which, as is well known in the art of draft gearing, is a medium well adapted for the absorption of shock. The absorption is further produced through the medium of a heavy spring, which is acted upon when the arms are swung; and the resistance offered by the compression of the spring coöperates with the friction resulting from the sliding of the friction blocks upon the arms within their respective seats to absorb the shock to which the device is subjected.

The device of the present invention comprises a rectangular casing 8, which, at its inner end, is formed with lugs 9 for attachment to the car structure, and is further provided on its inner end with projections

10, around which passes a yoke 11 of the type ordinarily employed in draft gear constructions, and which is secured to the ordinary inner head of a coupler, this head resting against the outer flat face of an outer follower plate 12. The outer follower plate 12 is best shown in Fig. 7, and comprises a body portion 14, which is formed with depending lugs 15 of a plate-like nature, and which, as shown, are oppositely disposed from one another. Each of the lugs 15 is formed with an elongated slot 16 in the body thereof, which are adapted to receive a stud or projection 17 positioned adjacent the outer end of the casing. These studs, as shown more clearly in Fig. 6, are of a size less than the size of the slot 16. No particular form of stud or projection is prescribed, but it may be generally stated that anything will do which will serve to prevent disengagement of the outer follower plate or cap from the body of the casing, and at the same time permit of a sliding movement between the outer follower or cap plate and the casing. The outer end of the casing is further provided with ribs 18, as shown in Fig. 6, which form in effect guide members for the lugs 15. The inner surface of the outer follower plate is ribbed, as shown in Fig. 7, to provide a series of pockets 19 on the inner face thereof. All of these pockets are concave in formation, and two of these pockets 20, as will be seen from a study of Fig. 7, are lying opposite to one another and toward the outside and to one side of the vertical center of the plate, taking the vertical center as it is shown in this figure, although it is understood that the terms vertical and horizontal used to describe these pockets only apply to the plate in the position in which it is shown in Fig. 7, and are merely terms used for the sake of clearness of description and are not intended in any sense as terms of limitation. Interposed between the pockets 20 is a central pocket 21 of substantially twice the size of the pockets 20 and lying to the opposite side of the vertical center of the forward follower plate 12 from that to which the pockets 20 are lying. This gives a staggered relation to the pockets in the inner face of the follower plate 12, the purpose and function of which will be more fully hereinafter set forth.

Lying within each of the pockets 20 and 21 is a semi-circular friction block 22, the flat face 23 of each of which blocks rests against the face of a selected arm of one of a series of swinging arms. These arms are shown more in detail in Fig. 5 and consist of companion outer arms 24 and an inner arm 25. The outer arms 24 are pivoted to a pin 26 mounted within the side walls of the casing 27, which pin is keyed or otherwise locked to prevent rotation with respect to said casing. The arm 25 is mounted upon a pin 28 similar to the pin 26, and positioned, as shown in Fig. 5, upon the opposite side of the casing. The arms 24 co-act with the outer of the blocks 22, that is, the blocks lying within the pockets 20; and the arm 25 co-acts with the center block 22, or the block lying within the pocket 21.

The arm 25 is pivoted to the same side of the vertical center of the plate 12 as the pocket 21 is located; and the arms 24 are pivoted to the same side of the vertical center of the plate 12 as the pockets 20 are located. Hence, the outer of the blocks 22 are located relatively adjacent to the pivotal center of the arms 24; and the central block of the blocks 22 is located relatively adjacent to the pivotal center of the central arm 25. As heretofore stated, the closer the blocks are placed to the pivotal center of the respective arms, the greater will be the frictional resistance offered by the co-action of these two members. Thus, by this arrangement a substantial frictional resistance will be offered by the forward frictional devices.

Each of the arms, as shown more clearly in Fig. 4, is provided with oppositely disposed flat faces 29 and 30. The faces 29 cooperate with the flat surfaces of the blocks 22 heretofore referred to; and the face 30 coöperates with the flat faces of a series of blocks 31, comprising companion outer blocks and an inner block. These blocks have the same general characteristics as the blocks 22, but are somewhat smaller in size and are positioned in parallelism with one another, in place of the staggered arrangement given to the blocks 22. The blocks 31 are mounted within a concave recess 32 formed in a face of a rear socket member or head 33; and these blocks 31 will, for clearness of description, be termed the rear friction blocks, while the blocks 22 will be termed the forward friction blocks.

It has been found in practice that by arranging the forward set of blocks relatively close to the pivotal center of the arms in the manner described, and by making these blocks of a size so as to present a relatively large frictional surface, sufficient of the shock will be absorbed by the forward set of blocks or friction devices to enable the inner blocks to perform their function and still be of a relatively small size and arranged in parallelism with one another. This results in a lessening of the amount of material used and a simplification of the parts, and hence in a cheapening of the cost of construction. The rear socket member 33 is engaged by a coil-spring 34, which lies within the casing 8 and constitutes the compression member which coöperates with the frictional devices to absorb the shock. Each of the arms 24 and 25 is provided with rims or flanges 35 extending along their longitudinal edges, between which flanges the fric-

tion blocks travel; and these flanges serve to prevent transverse slippage of the blocks with respect to the surface of the arms.

In assembling the device, it is deemed advisable to place the spring under an initial compression. To accomplish this, a rod 36, shown in Fig. 4, is used. This rod, however, is merely used during the assembling of the device and does not enter into the composition of the structure after the parts have been assembled. This rod 36 has a screw-threaded end which is entered into a boss 37 in the rear socket member 33, and a screw-threaded end which projects beyond the end of the casing and receives a nut 38, so that by turning the nut 38, the plate 31 can be drawn toward the rear of the casing and the spring 34 placed under initial compression, this being the first step in assembling the gear.

The last step in the assembling of the gear is to place the forward follower plate 12 in position. This is accomplished by slightly bending the depending portions 15 of the plate and slipping them over the ends of the casing until the projections 17 have entered the slots 16, and then re-bending the depending portions 15 back into normal position. The rod 36 can then be removed from the structure and the parts will assume the position shown in Fig. 2, the projection 17 engaging with the walls of the slot and serving to limit the outward movement of the outer follower plate, so that the parts are held normally in the position shown in Fig. 2, with the spring 34 placed under an initiatory compression. It is deemed advisable in devices of this kind to place this initiatory compression on the spring in order that the spring may perform its shock absorbing function at the commencement of movement of the friction devices. Thus no movement will be necessary to initially compress the spring to a point where it becomes effective in the operation of absorbing the shock, but it begins to absorb the shock upon the initial movement of the friction members. It will be understood that the entire strain of the compressed spring is not placed upon the projection 17 and the follower plate 12, since the major portion of this strain is consumed by the friction devices lying intermediate of the spring and follower plate.

The operation briefly is as follows: Taking the parts as shown in Fig. 2 to be in normal position, then when the device is subjected to a jolt or jar, the outer follower or cap plate is forced inward into the position shown in Fig. 3. This forces the blocks 22 inward, and the engagement of these blocks with the arms 24 and 25 swings these arms down into the position shown in Fig. 3. This swinging movement will cause the blocks 22 to slide along the faces of the arms 24 and 25, and will also cause the blocks to slide within the pockets 20 and 21, thus creating two points of frictional engagement for the blocks 22, namely, the engagement of the flat surfaces of the blocks with the faces of the arms 24 and 25, and the engagement of the rounded surfaces of the blocks with the faces of the pockets 20 and 21. The swinging of the arms inward into the position shown in Fig. 3 will cause the blocks 31 to slide upon the faces 30 of the arms and to slide within the recess 32 in the rear socket member 33. This will set up a frictional resistance between the flat face of the blocks 31 and the arms 24 and 25 similar to the frictional resistance set up between the blocks 22 and the arms 24 and 25 heretofore referred to, and will also set up a frictional resistance between the rounded surfaces of the blocks 31 and the faces of the recess in which said blocks rest. The movement of the arms 24 and 25 will tend to force the block 31 and rear follower plate inward and compress the coil-spring 34, this member absorbing such of the shock as is not absorbed by the friction devices. The forward friction blocks 22 will, through their movements and co-action with the arms 24 and 25, absorb a large portion of the shock; and a large portion of the shock will be transferred through said arms to the side walls of the casing; and further, a portion of the shock will become absorbed and dissipated as heat. The strain to which these parts are subjected will be imparted through the arms onto the pins upon which they are respectively mounted, and through these pins to the casing of the draft gearing. Thus, a safe portion of the strain is imparted to the walls of the casing, and the mechanism of the gearing is relieved from the strain incident to the shock. This principle, however, is fully explained in my former patent. Such portion of the shock as is not absorbed in the manner above set forth is imparted to the rear friction members, and the major portion of the balance absorbed by these latter friction members; and the residue of the shock is then imparted to the spring where it is finally absorbed.

From the foregoing description it will be seen that the outer follower plate performs the function of serving as one of the friction devices, namely, the mounting for the forward friction blocks; serves as a follower plate to which the draw-bar is connected; and serves as the member for maintaining the spring in its normal compressed condition and for maintaining the operating parts of the draft gearing in their respective operative positions.

By utilizing the form of forward follower plate shown and described, the outer friction members, in the present case the blocks 22, can be located beyond the forward end of the casing. Thus, in designing the device,

it will not be necessary to make the members of a size to fit within the casing, but they may be made of a substantially large size, and hence their efficiency in operation increased.

By utilizing the flanges 10 shown in Figs. 2 and 3, a reinforcing rib is produced for the bottom of the casing, which acts as a substitute for the ordinary filler block, over which the rear end of the yoke passes. The use of these flanges reduces the cost of construction of the device, as well as the weight thereof.

I claim:

1. In a draft gearing, the combination with a casing and friction devices, of a forward follower plate serving as a portion of the friction devices, a spring within the casing, and means for securing the follower plate to the body of the casing, whereby the spring is maintained under an initial compression by said follower plate, substantially as described.

2. In a draft gearing, the combination with a casing and friction devices, of a forward follower plate serving as a portion of the friction devices, a spring within the casing, means for securing the follower plate to the body of the casing, whereby the spring is maintained under an initial compression by said follower plate, and members upon the casing for guiding the follower plate in its movements, substantially as described.

3. In a draft gearing, the combination of a casing, a spring within the casing, forming a portion of the shock absorbing devices, an outer follower plate having a sliding movement longitudinally of the casing, and means for limiting the outward movement of the plate from the casing, whereby the spring is maintained under an initial compression by the follower plate, substantially as described.

4. In a draft gearing, the combination of a casing, a spring within the casing, forming a portion of the shock absorbing devices, an outer follower plate having a sliding movement longitudinally of the casing, means for limiting the outward movement of the plate from the casing, whereby the spring is maintained under an initial compression by the follower plate, and members upon the casing for guiding the follower plate in its movements, substantially as described.

5. In a draft gearing, the combination of a casing, a spring within the casing, forming a portion of the shock absorbing devices, an outer follower plate provided with members adapted to rest against the walls of the forward end of the casing, said members being provided with slots, projections on the casing entering said slots and limiting the outward movement of the follower plate from the casing, whereby the spring is maintained under an initial compression by said follower plate, substantially as described.

6. In a draft gearing, the combination of a casing, a spring within the casing, forming a portion of the shock absorbing devices, an outer follower plate provided with members adapted to rest against the walls of the forward end of the casing, said members being provided with slots, projections on the casing entering said slots and limiting the outward movement of the follower plate from the casing, whereby the spring is maintained under an initial compression by said follower plate, and members upon the casing for guiding the follower plate in its movements, substantially as described.

7. In a draft gearing, the combination of a casing, arms pivoted to opposite sides of the casing, forward and rear sets of friction blocks with which the arms engage, and flanges on said arms to prevent transverse slippage between the arms and blocks during the movements thereof, substantially as described.

8. In a draft gearing, the combination of a casing, a series of arcuate-shaped flanges extending from the rear wall of the casing, and a yoke member passing over said flanges, substantially as described.

9. In a draft gearing, the combination of a casing, a follower plate, having a series of staggered pockets to receive friction devices formed in the inner face thereof, and having its outer face provided with a straight flat surface adapted to receive the drawbar, and members upon said plate for securing it to the casing, substantially as described.

10. In a draft gearing, the combination of a casing, a set of swinging friction members within the casing, a set of slidable friction members within the casing, one of said sets of members being provided with flanges adapted to engage surfaces on the other set of friction members, substantially as described.

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