No. 768,453. PATENTED AUG. 23, 1904.

P. HIEN.

DRAW GEAR AND BUFFING APPARATUS.

APPLICATION FILED JULY 27, 1901.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

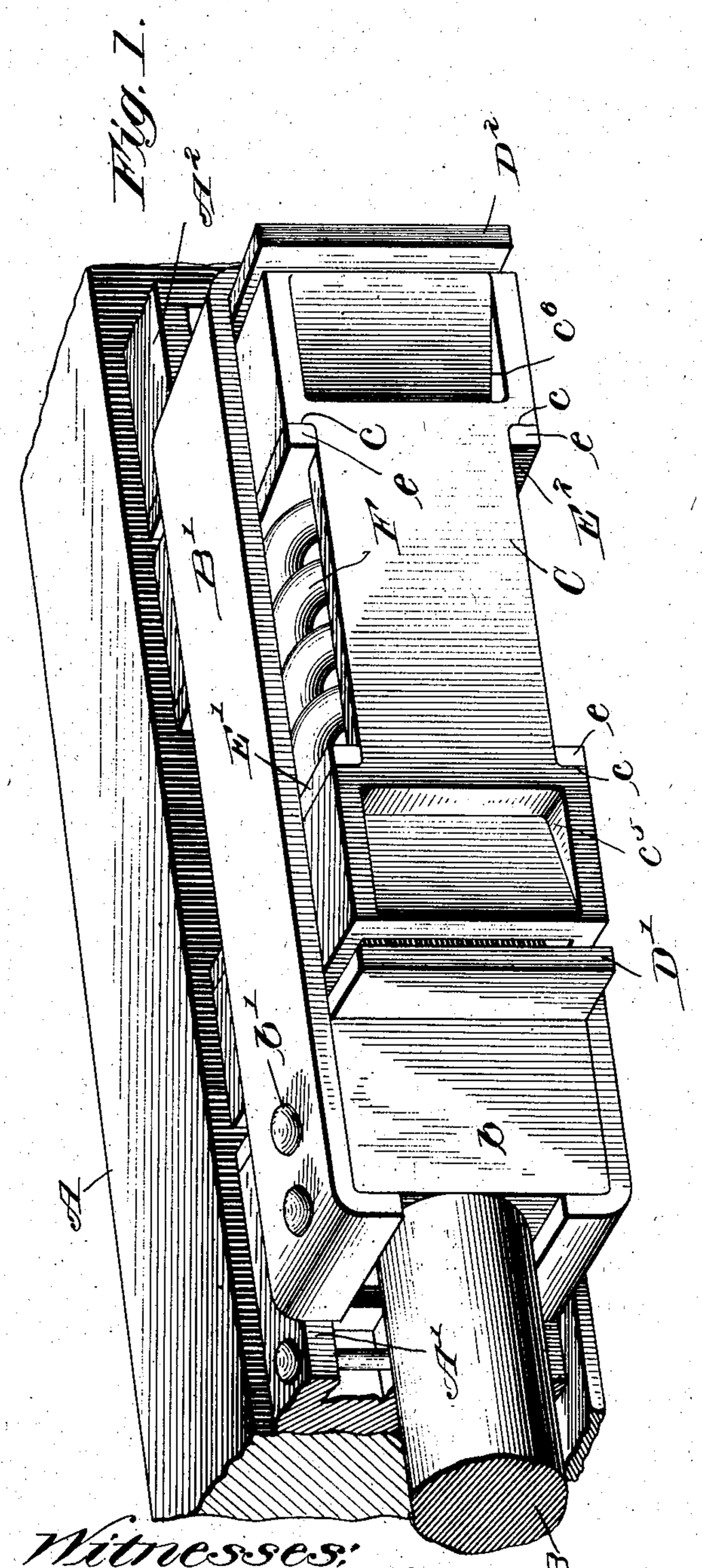


Fig. 6.

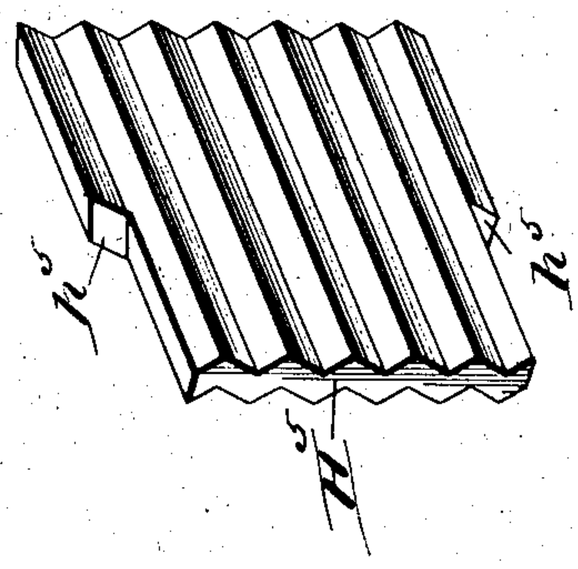


Fig. 5.

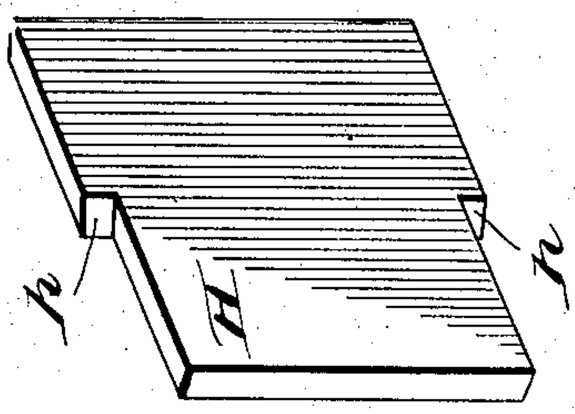
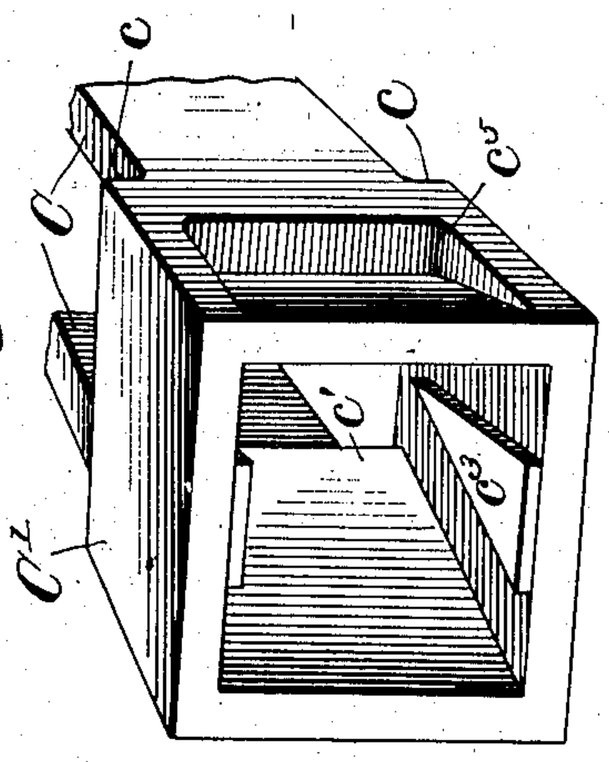


Fig. 4.



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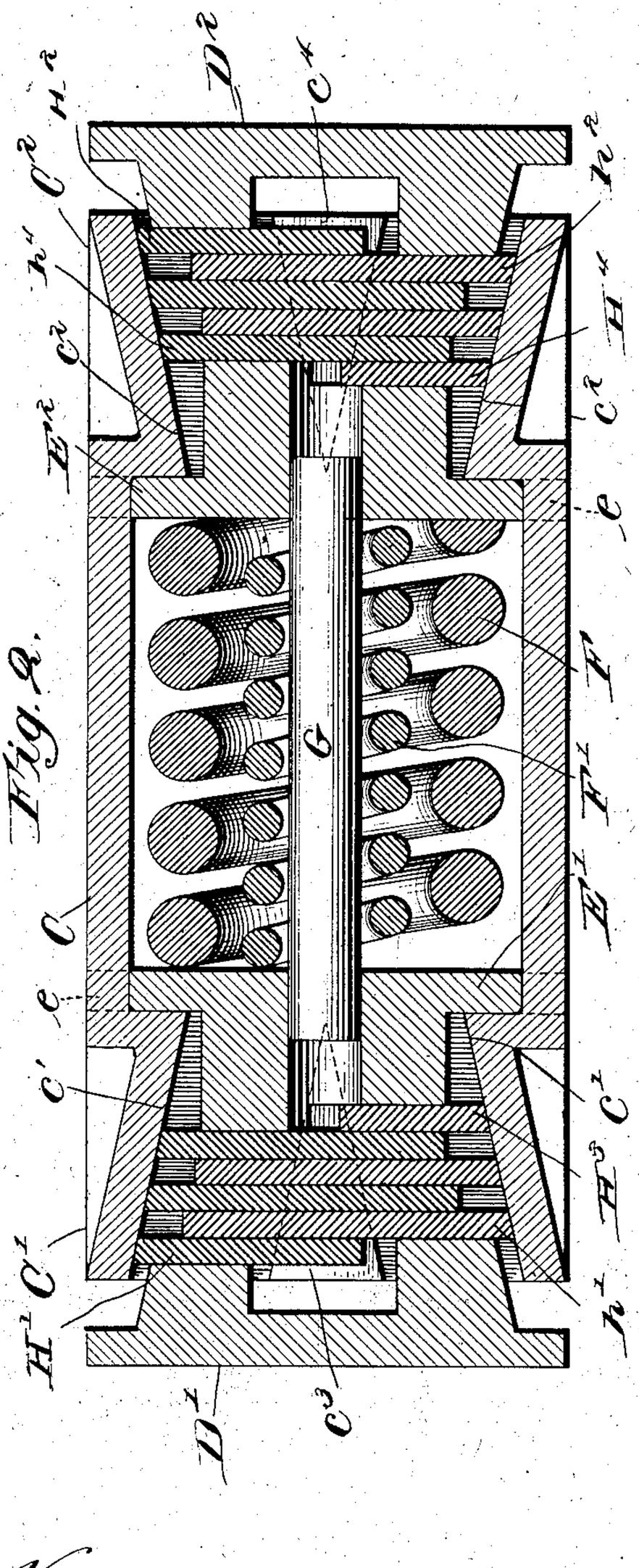
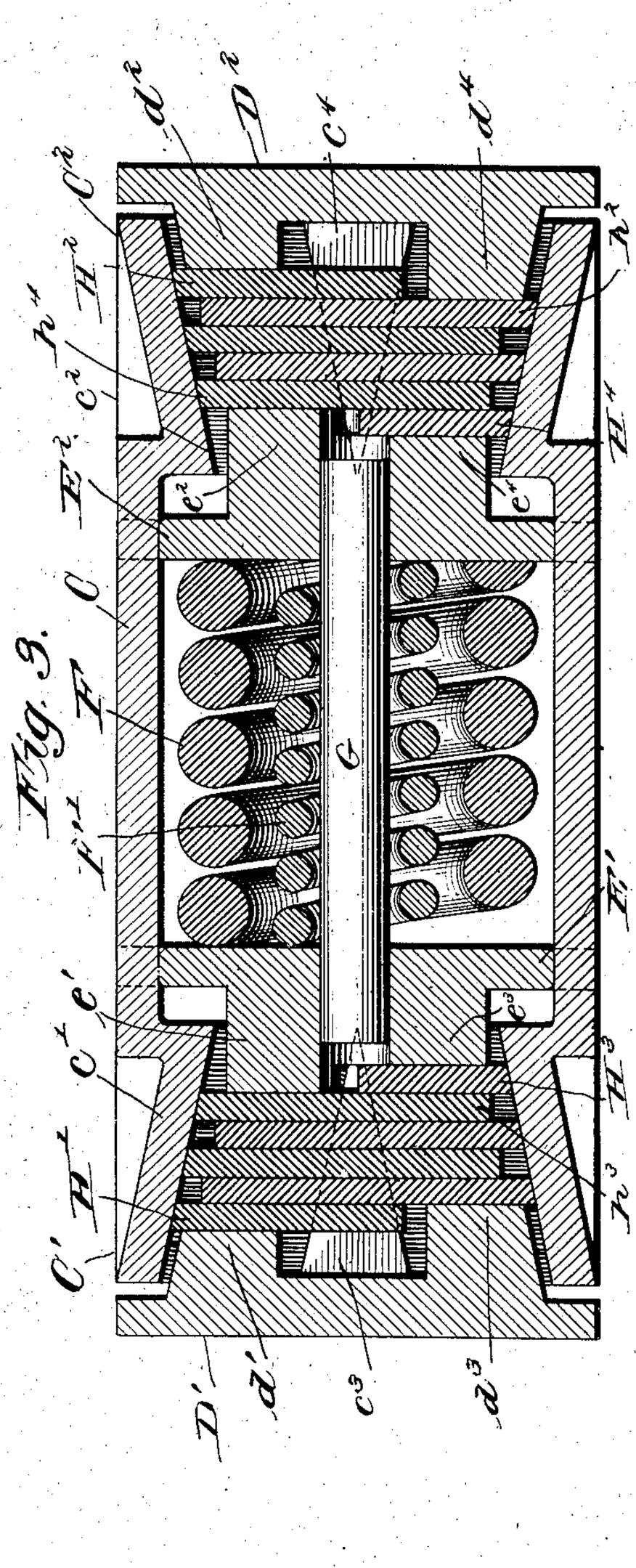
DRAW GEAR AND BUFFING APPARATUS.

APPLICATION FILED JULY 27, 1901.

NO MODEL. 2 SHEETS—SHEET 2.





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No. 768,453. Patented August 23, 1904.

UNITED STATES PATENT OFFICE.

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DRAW-GEAR AND BUFFING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 768,453, dated August 23, 1904.

Application filed July 27, 1901. Serial No. 69,986. (No model.)

To all whom it may concern:

Be it known that I, PHILLIP HIEN, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Draw-Gear and Buffing Apparatus; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates in general to mechanism adapted to be interposed between the draw-bar and the draft-timbers of a car, commonly known as "draw-gear and buffing apparatus," and more particularly to that type of such apparatus in which a frictional resistance is produced and exerted to reduce or dissipate the shocks due to the pulling or buffing force, and thereby avoid the injurious effects resulting from the sudden and violent contact between the draw-bar and car-frame.

The greater the weight of the cars forming a train the greater is the strain upon the draft mechanism, and consequently the increased capacity of modern freight-cars has created a need for more effective apparatus for graduating the force of the contact between the draft mechanism and the car-frame when a relative movement occurs in acquiring and destroying momentum.

The object of my invention is to provide a draw-gear and buffing apparatus of the type referred to which will produce the resistance requisite for graduating the strain between the draw-bar and frame of the car and which will also prevent the sudden recoil of the resistance-producing elements when the strain is relieved.

A further object of my invention is to construct an apparatus of the class mentioned in which overlapping friction devices are disposed between either end of a compression-spring and unyielding mechanism connected to the draw-bar, so that a sharp blow is delivered directly upon the friction devices whenever the draw-bar is suddenly moved relatively to the draft-timbers of the car in buffing and pulling. A sharp blow, produced as described, instantaneously overcomes the static friction between the friction devices and moves them longitudinally against the tension of the interposed spring, thereby producing the desired retardation to the movement of the draw-bar through a transverse relative movement of the overlapping friction devices.

In draw-gear and buffing apparatus as constructed prior to my invention in which overlapping friction devices have been employed to retard the movement of the draw-bar such devices have been forced into frictional engagement by springs interposed between the mechanism connected to the draw-bar and the friction devices, whereby a yielding pressure results from a sudden movement of the draw-bar which is ineffective to overcome the static friction of the overlapping devices, and hence the movement of the draw-bar must be retarded by the compression of the springs rather than by the frictional resistance between the overlapping devices.

My invention, generally stated, consists in overlapping friction devices which have frictional resistance imposed upon them by a longitudinal movement and which are relatively moved transversely to forcibly retard the movement of the draw-bar relative to the draft-timbers in pulling and buffing.

My invention further consists in locating in each end of a casing or housing friction devices for exerting a resistance whenever a pulling or buffing action occurs, the friction devices on both ends acting substantially simultaneously or successively in both instances.

My invention will be more fully described hereinafter with reference to the accompanying drawings, in which the same is illustrated as embodied in a convenient and practical form, and in which—

Figure 1 is a perspective view of so much of a draw-bar, draft-rigging, and guides therefor secured to the draft-timbers of a car as is necessary to show the connection of my improvement therewith; Fig. 2, a longitudinal horizontal section through the center of

my invention removed from the car; Fig. 3, a view similar to Fig. 2, showing the apparatus in the position which it assumes during a buffing or pulling action; Fig. 4, a perspective view of the end of the casing or housing; Fig. 5, a perspective view of one of the friction devices removed from the apparatus, and Fig. 6 a perspective view of a modified form of the friction device.

Similar reference characters indicate the same parts in the several views of the drawings.

My invention is illustrated as embodied in a casing or housing within the opposite ends of which are located friction devices, such friction devices being interposed between interior spring-pressed follower-plates and exterior follower-plates engaged by the draw-bar and strap connected thereto. The friction-plates are brought into frictional contact by a longitudinal movement and are then relatively moved transversely to produce the desired retardation of the movement between the casing and the followers D' and D^2, and consequently of the movement of the draw-bar B relative to the draft-timbers of the car.

A indicates one of the draft-timbers of a car, to which is secured suitable guides for supporting the draw-gear and friction apparatus, such guides comprising stops A' and A^2, engaged by the ends of the follower-plates D' and D^2. Any suitable means may, however, be used for operatively connecting my improved apparatus to the car-frame and also to the draw-bar. I have shown the end of the draw-bar B operatively connected with my improved apparatus by the usual means—namely, a strap or yoke B', connected at its ends to the enlarged rear end b of the draw-bar by suitable fastening devices b'. The buffing apparatus is located within the strap with one of the follower-plates D' engaging the end of the draw-bar b and the other follower-plate D^2 engaging the end of the strap opposite the draw-bar.

C indicates the casing or housing, which consists in end portions C' and C^2, preferably rectangular in shape, and side portions C, connecting the end portions, preferably formed integral therewith. The opposite interior sides of the end portions are provided with inclined surfaces c' and c^2, respectively, while the interior surfaces of the upper and lower sides of each of the end portions C' and C^2 are provided with wedge-shaped guides c^3 and c^4, respectively. The exterior surfaces of the sides of the end portions may be cored out, as shown at c^5 and c^6, if desired, to reduce the weight of the casing.

Follower-plates E' and E^2 are located between the end portions C' and C^2 and are supported by and guided on the side portions C C by means of projecting lugs e, which engage shoulders c, formed at the points where the side portions C C join the end portions C' and C^2. The distance between the upper and lower edges of the follower-plates E' and E^2 is substantially equal to the height of the end portions of the casing, so that the upper and lower edges of the follower-plates are substantially flush with the upper and lower surfaces of the end portions of the casing.

Interposed between the follower-plates E' and E^2 is a spring F, and, if desired, an auxiliary spring F' may be located within the spring F, both of such springs bearing at their ends upon the inner faces of the follower-plates E' and E^2. A guide-rod G, which may be tubular in form, passes longitudinally through the centers of the springs and is supported at its ends in openings formed through the centers of the follower-plates E' and E^2. The guide-rod G serves to prevent the displacement of the springs from between the follower-plates.

The follower-plates E' and E^2 are provided with reduced extensions, which project outwardly within the inner ends of the openings through the end portions C' and C^2 of the casing. These reduced extensions are preferably formed in two integral parts e' and e^3 on the follower-plate E' and e^2 and e^4 on the follower-plate E^2. The parts e' and e^2 are preferably longer than the parts e^3 and e^4, whereby a shoulder is formed at the point where parts e' and e^3 and e^2 and e^4, respectively, unite.

Follower-plates D' and D^2 are located at the ends of the casing and are provided with projecting portions d' and d^3, extending inwardly from the follower D' within the outer end of the opening through the end portion C' of the casing, while the projecting portions d^2 and d^4 extend inwardly from the follower D^2 within the outer end of the opening through the end portion C^2 of the casing. The projecting portions d' and d^2 are slightly shorter than the projecting portions d^3 and d^4 for a purpose subsequently to be described.

The casing is supported through its engagement with the guides secured to the draft-timbers so as to be capable of a bodily movement in either direction.

A series of any desired number of overlapping friction-plates are located within the openings through the end portions C' and C^2 of the casing and between the followers D' and E' and E^2 and D^2, respectively. These overlapping friction devices are for convenience shown in the form of plates, which may, if desired, be provided with ribs to increase their superficial area, as shown in Fig. 6, or these overlapping members may be of any other desired form. Each of the follower-plates is provided with a beveled end corresponding in inclination to the inclined inner surface of the sides of the end portions C' and C^2 of the casing. At each side of each of the friction-plates is a shoulder h, inclined to correspond with the edges of the wedges c^3 and

c^1. The distance between the end of the friction-plate which engages the side of one of the end portions and the shoulder h, which engages the edge of one of the wedges, is substantially equal to the distance between the inclined sides of the end portions C′ C² and the adjacent edges of the wedges. The outer friction-plates H′ and H² extend from one of the inclined surfaces to the end portions transversely across the opening therein and terminate a distance from the opposite inclined surface greater than the width of the projecting portions d^3 and d^4, extending inwardly from the follower-plates D′ and D², as clearly shown in Figs. 2 and 3 of the drawings. The inner friction-plates H³ and H⁴ extend from one of the inclined surfaces of the end portions to a point slightly beyond the guide-wedges. The inner face of the friction-plate H³ rests upon the reduced extension e^3 of the follower-plate E′, while the friction-plate H⁴ rests upon the reduced extension e^4, extending outwardly from the follower-plate E². The upper extension e' of the follower-plate E′ projects beyond the lower extension e^3 a distance equal to the width of the friction-plate H³ and is engaged by the overlapping friction-plate h^3, the latter also engaging the friction-plate H³. The arrangement at the opposite end of the apparatus is similar—namely, the friction-plate H⁴ rests upon the reduced extension e^4, while the extension e^2 projects upon the inner edge of the friction-plate H⁴ and engages the next friction-plate h^4, the latter also engaging the surface of the friction-plate H⁴ opposite that engaged by the extension e^4. The projecting portion d' engages the outer face of the first friction-plate H′, while the projecting portion d^3 extends beyond the end of the friction-plate H′ and engages the second friction-plate, the latter also engaging the face of the friction-plate H′ opposite to the face engaged by the extension d'. At the opposite end of the casing a similar arrangement occurs—namely, the extension d^2 engages the outer face of the first friction-plate H², while the extension d^4 projects beyond the end of the friction-plate H² and engages the outer face of the second friction-plate, the latter also engaging the adjacent face of the first friction-plate H².

Fig. 6 illustrates a modified form H⁵ of the friction-plate comprising corrugated or ribbed engaging surfaces. h^5 in this figure indicates shoulders to engage the edges of the guide-wedges.

The operation of my improved apparatus is as follows: When a pulling strain is exerted upon the draw-bar B through the coupler, the yoke B′ through its engagements with the exterior follower D² forces the latter against the friction-plates with which it engages through the extensions d^2 and d^4. The overlapping friction-plates H² H⁴ and any suitable number of friction-plates interposed between such end plates are thereby forced into frictional engagement with each other owing to the tension of the springs resisting the movement of the follower-plate E². Frictional resistance is therefore imposed upon the friction-plates both through their contact with each other and through the contact of the outer ones which engage with the extensions d^2 and d^4 of the follower-plate D² and with the extensions e^2 and e^4 on the interior follower-plate E². The inclined inner faces c^2 within the end portion C² through their engagement with the ends of the friction-plate cause the latter to relatively slide transversely and thereby retard the movement of the follower D² and consequently retard the movement of the draw-bar B through the intervening strap B′. The opposite exterior follower-plate D′ is held in fixed relation with the draft-timbers owing to suitable stops, one of which is shown at A′. The engagement between the ends of the friction-plates and the inclined surfaces c^2 of the end portion C² carries the casing bodily toward the follower D′, and thereby forces into frictional contact the friction-plates within the end portion C′ through the engagement of such plates with each other and also with the extensions d' and d^3 upon the follower-plate D′ and the extensions e' and e^3 upon the interior follower-plate E′. This frictional resistance is due to the tendency of the springs to prevent the inner movement of the follower-plate E′. The friction-plates within the end portion C′ are relatively moved by the inclined surface c' of the end portion C′ as the latter approaches the follower D′. The movement of the draw-bar B is therefore retarded by the friction-plates in the end portion C′ of the casing through the retardation which they exert to the movement of the casing C.

The action of my improved apparatus when a strain is exerted upon the draw-bar in an opposite direction to that described when a relative movement takes place between adjoining cars is similar in all respects to the operation above described which takes place when the draw-bar is subjected to a draft or outward strain, except that the follower-plate D² is held immovable with respect to the draft-timbers by suitable stops, one of which is shown at A², while the follower-plate D′ is engaged by the end b of the draw-bar B and forced thereby in a direction toward the follower-plate D², transmitting force through the friction devices to the spring. When the strain upon the draw-bar is relieved, the follower-plates will be gradually returned to their normal positions relative to the casing by the expansion of the springs, such expansion moving the followers E′ and E² outwardly, thereby returning the series of friction-plates through their engagement with the guide-wedges C³ and C⁴ to their normal positions, and through their contact with the extensions on the followers D′ and D² the latter are forced into engagement with the stops A′ and A²

upon the draft-timbers. No special means are therefore required for restoring the parts of my apparatus to their normal positions, such restoration being accomplished by the expansion of the springs the compression of which effected the frictional engagement between the series of overlapping plates.

From the foregoing description of the operation of my mechanism it is evident that I have produced a draw-gear and buffing apparatus in which a series of friction devices are brought into frictional contact by a longitudinal movement thereof through contact with exterior follower-plates and through contact with interior follower-plates, the movement of the latter being resisted by spring-pressure. The series of friction devices are brought into frictional contact through a direct or unyielding engagement with the mechanism connected to the draw-bar, whereby a sharp blow is delivered upon the friction devices whenever a sudden movement of the draw-bar occurs, such blow instantaneously overcoming the static friction of the devices and permitting their relative movement to produce the requisite retardation to the draw-bar. It is also evident that in my improved apparatus the retardation is due to the relative transverse movement of the friction devices when in frictional contact with each other, such movement being caused by their engagement with the inclined inner faces of the end portions of the casing. It is also evident that in my apparatus, whether subjected to a pulling or buffing action, the friction devices at both ends are substantially simultaneously or successively pressed into frictional engagement and then relatively moved to produce the requisite retardation.

I do not claim in this application either the casing or friction devices *per se*, as I have claimed them as articles of manufacture in my copending application Serial No. 75,607, filed September 16, 1901.

While I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form, the proportion of parts, and the substitution of equivalents as circumstances may suggest or render expedient without departing from the spirit of my invention.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a draw-gear and buffing apparatus, the combination with a series of detached overlapping friction devices, of means for forcing said devices into a frictional engagement, and means for moving adjacent devices in opposite directions, substantially as described.

2. In a draw-gear and buffing apparatus, the combination with a series of overlapping friction devices, of means for moving adjacent devices transversely to the line of draft and in opposite directions, substantially as described.

3. In an apparatus of the class described, the combination with a casing, of overlapping friction devices therein, means for forcing said devices into frictional engagement by a longitudinal movement thereof, and means for relatively moving said devices transversely to the line of draft, substantially as described.

4. In an apparatus of the class described, the combination with a casing, a follower adapted to move relatively to said casing, a spring adapted to resist the movement of the follower, overlapping friction devices interposed between said follower and spring, and means for moving adjacent devices in opposite directions, substantially as described.

5. In a draw-gear and buffing apparatus, the combination with a casing having inclined interior surfaces, of overlapping friction devices engaging said inclined surfaces, means for yieldingly resisting the movement of said devices, means for moving said devices longitudinally into frictional contact, said devices being relatively moved transversely to the line of draft through their engagement with the inclined interior surfaces on said casing, substantially as described.

6. In a draw-gear and buffing apparatus, the combination with a casing having inclined interior surfaces, of a follower adapted to be moved relatively to said casing, a compression-spring adapted to resist the movement of said follower, overlapping friction devices interposed between said follower and said spring and engaging said inclined surfaces of the casing, whereby the movement of said follower imposes a frictional resistance upon said overlapping devices while the latter are relatively moved transversely through their engagement with the inclined interior surfaces of said casing, substantially as described.

7. In an apparatus of the class described, the combination with a casing, of friction devices located in each end of said casing, means for simultaneously longitudinally moving said devices into frictional contact, and engaging means between said devices and each end of the casing for relatively moving adjacent devices, substantially as described.

8. In an apparatus of the class described, the combination with a casing, of friction devices located at each end of said casing, followers at each end of and adapted to simultaneously move relative to said casing and thereby force said devices into frictional contact, substantially as set forth.

9. In a draw-gear and buffing apparatus, the combination with a casing, of overlapping friction devices within each end thereof, means for simultaneously imposing frictional resistance upon said devices within each end of said casing, and engaging means between said

casing and friction devices for relatively moving adjacent devices to produce the desired retardation, substantially as described.

10. In a draw-gear and buffing apparatus, the combination with a casing, of detached overlapping friction devices at each end thereof, means for forcing said devices into frictional engagement, and means for moving adjacent devices transversely in opposite directions, substantially as described.

11. In an apparatus of the class described, the combination with a casing, of friction devices engaging each end of said casing, followers at each end of said casing engaging said friction devices, means for moving either of said followers toward the other and causing the friction devices which it engages to engage and bodily move said casing toward the other follower, whereby said devices are forced into frictional engagement simultaneously at each end of the casing, substantially as set forth.

12. In a draw-gear and buffing apparatus, the combination with a casing, of followers at each end of said casing, means for limiting the movement of the followers away from each other, friction devices engaging and interposed between each end of said casing and the adjacent follower, means for yieldingly resisting the movement of said friction devices toward the center of the casing, whereby the movement of either of said followers toward the other will force into frictional contact the devices engaged by said follower and through the engagement of such devices with the casing will move the latter bodily toward the follower and thereby impose frictional resistance upon the devices between that end of the casing and the adjacent follower, substantially as described.

13. In a draw-gear and buffing apparatus, the combination with a casing, having at its ends inwardly-inclined interior surfaces, followers at each end of said casing, means for guiding said followers and limiting their movement away from each other, overlapping friction devices engaging said inclined interior surfaces at the ends of the casing, a compression-spring between the ends of which and said followers said overlapping friction devices are interposed, whereby frictional resistance is imposed upon said devices by longitudinal movement of either follower and said devices are relatively moved transversely by contact with the inclined interior surfaces of said casing, substantially as described.

14. In a draw-gear and buffing apparatus, the combination with the draft-timbers of a car, of a draw-bar, two series of friction devices, a spring interposed between said series of devices, means for connecting said series of friction devices to the draft-timbers of the car and to the draw-bar, and means for simultaneously moving adjacent devices in each series in opposite directions, substantially as described.

15. In a draw-gear and buffing apparatus, the combination with the draft-timbers of a car, of a draw-bar, two series of friction devices, a spring interposed between said series of devices, followers engaging the exterior devices of each series, means connecting said followers to the draw-bar and draft-timbers of the car, and means for relatively moving adjacent devices in each series transversely both in buffing and in pulling, substantially as described.

16. In an apparatus of the character described, the combination with a bodily-movable casing, of friction devices therein, means for forcing said devices into frictional engagement by a longitudinal movement thereof, and means for relatively moving said devices transversely to the line of draft, substantially as described.

17. In an apparatus of the character described, the combination with a bodily-movable casing, of friction devices located in each end of said casing, means for simultaneously longitudinally moving said devices into frictional contact, and engaging means between said devices and each end of the casing for relatively moving adjacent devices transversely, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

PHILLIP HIEN.

Witnesses:

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