(No Model.) 3 Sheets—Sheet 1.

G. WESTINGHOUSE, Jr.

DRAW GEAR AND BUFFING APPARATUS.

No. 545,994. Patented Sept. 10, 1895.

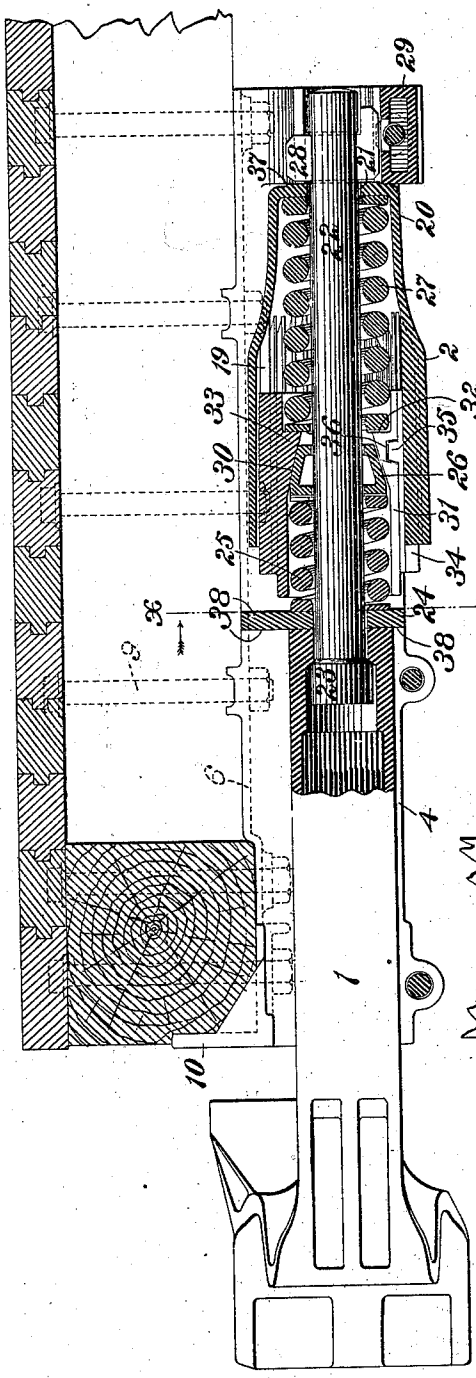


FIG. 1.

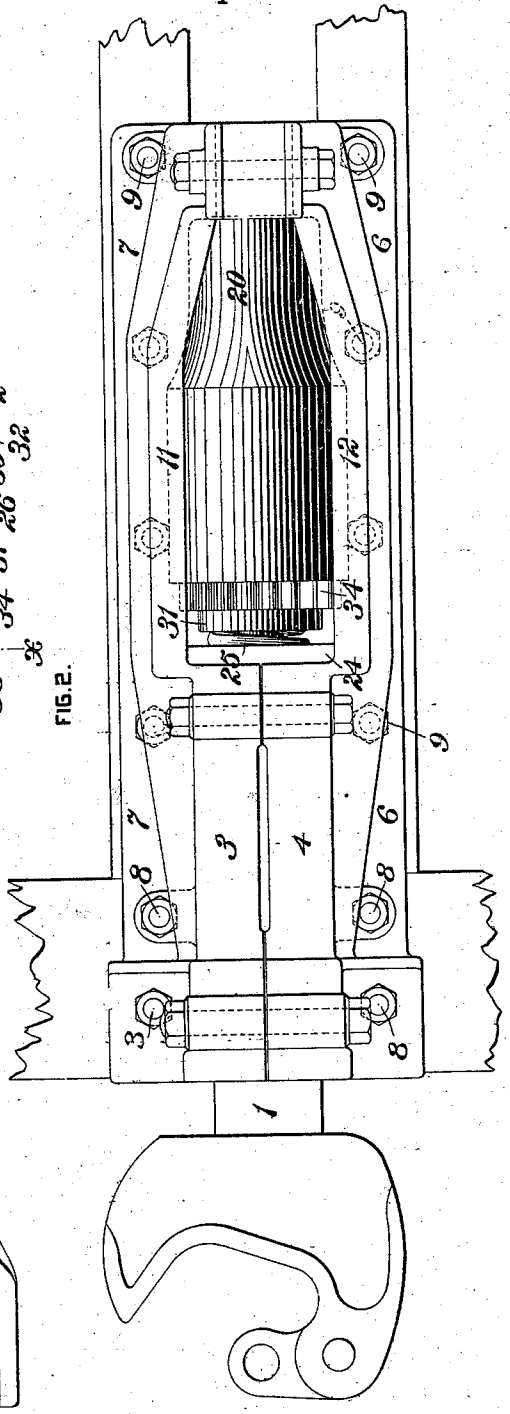


FIG. 2.

WITNESSES:

Chas. F. Miller.

T. J. Hogan.

INVENTOR,

Geo. Westinghouse Jr

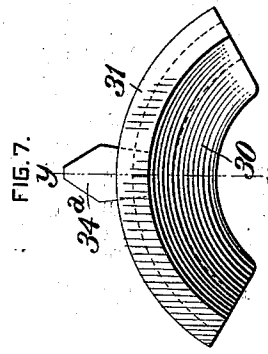
by Wooden & Bell, Att'y.

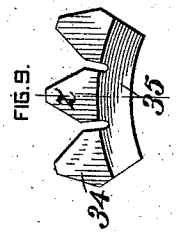
(No Model.) 3 Sheets—Sheet 2.

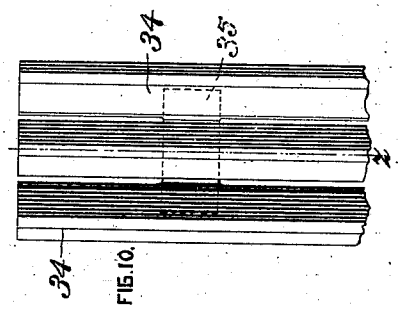
G. WESTINGHOUSE, Jr.

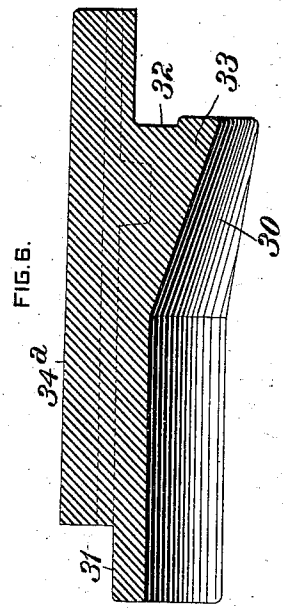
DRAW GEAR AND BUFFING APPARATUS.

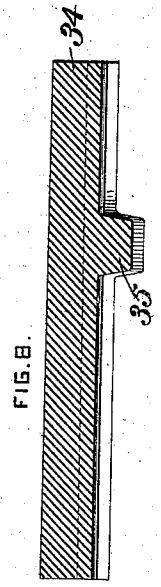
No. 545,994. Patented Sept. 10, 1895.

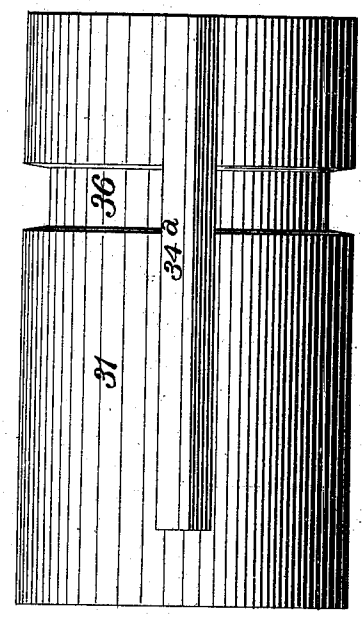


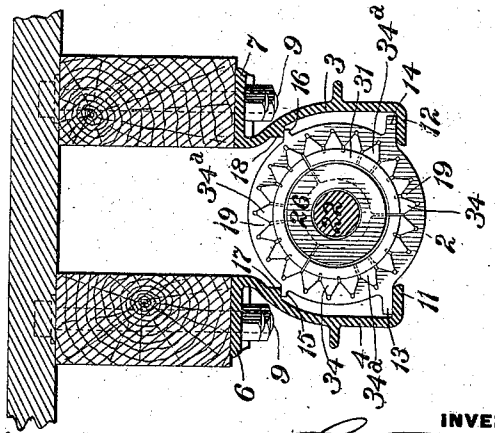












WITNESSES:

Chas. F. Miller.

T. J. Hogan.

INVENTOR,

Geo. Westinghouse Jr.

by Howson & Sons

Att'y.

(No Model.) 3 Sheets—Sheet 3.

G. WESTINGHOUSE, Jr.

DRAW GEAR AND BUFFING APPARATUS.

No. 545,994. Patented Sept. 10, 1895.

FIG. 4.

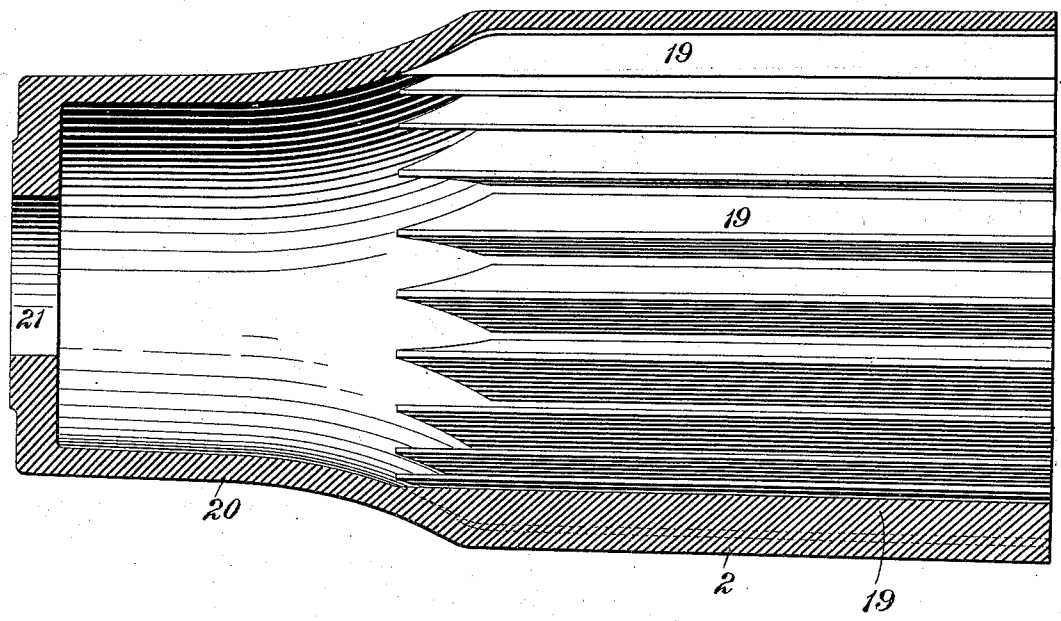
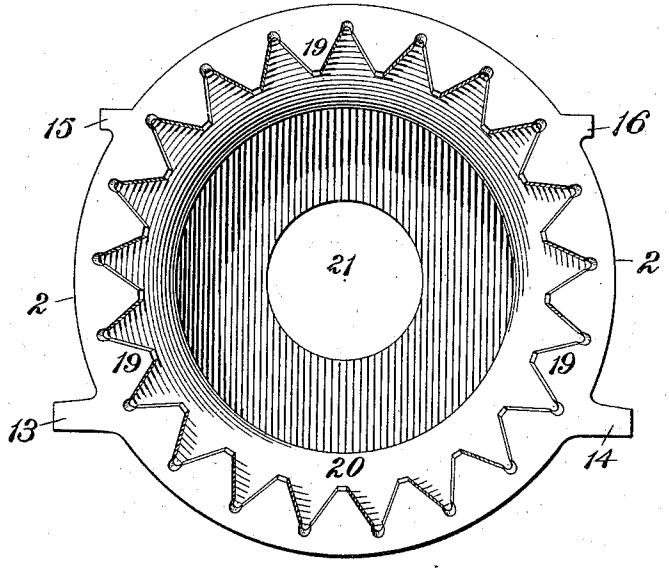


FIG. 5.



WITNESSES:

Chas. F. Miller.

T. J. Hogan.

INVENTOR,

Geo. Westinghouse Jr.

by J. Howden Bell.

Att'y.

UNITED STATES PATENT OFFICE.

GEORGE WESTINGHOUSE, JR., OF PITTSBURG, PENNSYLVANIA.

DRAW-GEAR AND BUFFING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 545,994, dated September 10, 1895.

Application filed July 17, 1895. Serial No. 556,232. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WESTINGHOUSE, Jr., a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Draw-Gear and Buffing Apparatus, of which improvement the following is a specification.

My invention relates to improvements in draw-gear and buffing apparatus of the same general class as that shown and described in my pending application, Serial No. 518,212, filed July 21, 1894; and its object is to provide certain improvements whereby the efficiency of the apparatus is increased, the construction simplified, and the cost of construction much reduced.

To this end my invention consists in a new and improved construction and combination of parts and in certain details of construction, all as hereinafter fully set forth.

In my present application I have shown my improved friction mechanism embodied in a combined draw-gear and buffing apparatus, as in my pending application, and in combination with an outer casing or frame of similar construction to that shown therein; but it is to be understood that my invention is not limited in its employment to an apparatus combining a draw-gear and buffing apparatus in a single structure, since the principal features of my invention may be employed in and form the essential features of devices which are operated by impact only as buffing devices, or in other devices in which the mechanism for modifying shocks and absorbing momentum is brought into operation by draft or a pulling action. It will be obvious that for the various purposes for which my improved friction apparatus may be employed other forms of outer casing or frame may be employed, and that in many instances the outer frame may be dispensed with—for example, in constructions in which the friction mechanism is brought into action by motion in one direction only, as in devices which operate only as buffers.

In my present application my improved friction apparatus is shown in combination with a draw-bar of a railway-car, the friction apparatus and the draw-bar being supported in an outer casing or frame, which is adapted to be secured to the bottom of a car. The friction-draft and buffing apparatus shown comprise a housing, an inner and an outer series of intercalated wedge-bars within the housing, carrier-plates against which the inner wedge-bars bear and by which they may be moved radially outward and also longitudinally, a wedge-block within the carrier-plates which is adapted to force the carrier-plates outward, preferably a draft-pin passing centrally through the housing and through the wedge-block and adapted to transmit the draft or pulling strains on the draw-bar to the housing, a spring surrounding the draft-pin between the inner end of the housing and the carrier-plate by which the pull on the draw-bar and draft-pin is transmitted to the carrier-plates, and a spring also surrounding the draft-pin which bears on the wedge-block and is adapted to be compressed by the inward movement of the draw-bar, whereby the wedge-block is actuated to press the wedge-bars together and to move the inner wedge-bars longitudinally relatively to the outer wedge-bars. This general combination of elements is not claimed, broadly, in this application, as a construction embodying such a combination is shown and described in my pending application before referred to; but my present invention provides certain new and useful improvements in the construction of some of the elements, and in their combination with one another, by which increased efficiency and simplicity of construction are obtained and the number of parts, the weight of the apparatus, and the cost of construction are all reduced.

In the accompanying drawings, Figure 1 is a central longitudinal section through a draw-gear and buffing apparatus embodying my invention; Fig. 2, an inverted plan view of the apparatus shown in Fig. 1; Fig. 3, a transverse section on the line $x\ x$ of Figs. 1 and 2; Fig. 4, a central longitudinal section through the housing of the friction buffing apparatus; Fig. 5, an end view of the housing, looking in the direction of the arrow shown in Fig. 4; Fig. 6, a central longitudinal section through a carrier-plate on the line $y\ y$ of Fig. 7; Fig. 7, an end view of the carrier-plate shown in Fig. 6; Fig. 8, a central longitudinal section

through one of the sets of inner wedge-bars on the line *z z* of Figs. 9 and 10; Fig. 9, an end view of the set of wedge-bars shown in Figs. 8 and 10; Fig. 10, a plan view of one of the sets of inner wedge-bars, and Fig. 11 a plan view of one of the carrier-plates.

The draw-bar 1 and the housing 2 of the friction buffing apparatus are supported in an outer frame or casing, which is formed of two longitudinal members 3 and 4, provided on their upper edges with flanges 6 and 7, which are adapted to be secured to the end sill and draft-timbers of a car by means of bolts 8 and 9. The portions of the main frame near the end of the car form an elongated box for containing the draw-bar, and their outer ends are provided with upwardly-turned flanges 10, which abut against one another and bear on the end sill of the car in position to form a striking-plate. In rear of the box or space containing the draw-bar the members of the outer frame are curved to approximate to the form of the housing, and are provided on their lower edges with inwardly-turned flanges 11 and 12, which form guides and supports for the lugs, ribs, or flanges 13 and 14, which project from the lower portion of the housing in position to rest and slide on the flanges 11 and 12. Similar smaller lugs, ribs, or flanges 15 and 16, which project from the upper portion of the housing, fit loosely under shoulders 17 and 18 on the outer frame and serve to prevent any undue upward displacement of the housing.

In my improved friction apparatus the housing consists of a single integral casting 2, on the inside of a portion of which are formed the outer wedge-bars 19 of the friction mechanism, so that the housing and the outer series of wedge-bars are formed in a single casting.

The rear or inner end portion 20 of the housing is somewhat smaller in diameter than the portion on which the outer wedge-bars are formed, but this difference in size is not essential. This contracted portion or extension 20 merely forms a pocket for the end of one of the springs, and it is only necessary that it should be large enough internally to receive the spring. The inner end of the extension 20 is closed except for an opening 21 formed through it for the draft-pin 22. That portion of the housing 2 on which the outer wedge-bars are formed is tapered longitudinally from its open outer end, which is nearer the draw-bar, to the extension 20, and the outer wedge-bars are of uniform depth radially, so that their inner edges may be said to form elements of a frustum of a cone having the same taper as the inside of the housing. In the drawings the tapered portion of the housing on which the outer wedge-bars are formed is shown of uniform thickness, and both the inside and the outside of that portion of the housing are shown tapered; but it is not essential that the outside of the housing should be tapered, and if preferred it may be made cylindrical in form.

The draft-pin 22, which is provided with a head 23, fitting in a socket in the inner end of the draw-bar, extends inwardly through a follower-plate 24, through the spring 25, wedge-block 26, spring 27, and through the inner end of the extension 20 on the housing. The inner end of the draft-pin is provided with a slot to receive a cotter 28, which is inserted from below and which is prevented from dropping down by the piece 29, which forms a strut or distance-piece between the ends of the outer casing or frame. The spring 25 bears at one end against the follower-plate 24 and at its other end against the wedge-block 26. The wedge-block 26 is tapered or conical on its outer surface, and is adapted to bear against the conical surfaces 30, which are formed on the inside of the carrier-plates 31. The spring 27 bears at one end against the closed inner end of the extension 20 of the housing, and at its other end the spring 27 bears against the shoulders 32 on the carrier-plates 31.

The carrier-plates 31 are segmental plates whose outer surfaces are cylindrical in form, and integral with each of the carrier-plates is formed a wedge-bar 34^a, which projects outwardly and forms one of the inner series of wedge-bars. The inwardly-projecting parts 33 on the carrier-plates form abutments for one end of the spring 27, and their inclined inner surfaces, which surround the wedge-block 26, form, with the inclined outer surface of the wedge-block, means whereby radial movement of the inner wedge-bars may be effected when the wedge-block and the carrier-plates are moved relatively to one another. On the outer surface of each of the carrier-plates are formed transverse or circumferential grooves 36, which extend from each side of the integral wedge-bars 24^a to the edges of the carrier-plates, and when the carrier-plates are placed in position around the wedge-block 26 the grooves 36 in each carrier-plate are circumferentially in line with the grooves 36 on the adjacent carrier-plates.

The outer and inner wedge-bars are, in cross-section, of the form shown in Figs. 5, 7, and 9; but my invention is not limited to the particular form or proportions shown. It is only necessary that the inner and outer series of bars should be so formed that when the inner series is forced outward and into contact with the outer series the wedging action of the bars on one another may be sufficient to produce the desired amount of friction when the inner and outer bars are moved relatively to one another, and that the total friction be distributed over sufficient surface to prevent undue heating or wear of the surfaces.

In my present improvement the inner wedge-bars 34, which are located between the integral wedge-bars 34^a on the carrier-plates, instead of being formed separately are formed in sets of three each and connected together by means of a transverse rib 35, which is

formed on their inner sides and adapted to fit into the grooves 36 in the carrier-plates. The ribs 35 on the wedge-bars 34 and the grooves 36 on the carrier-plates form means for engaging the inner wedge-bars with the carrier-plates, so that the carrier-plates and inner wedge-bars will move together longitudinally.

By forming the wedge-bars 34 as shown the number of separate parts is much diminished and the labor and cost of construction are reduced. It will be obvious that the number of bars forming a single set may be increased or diminished, and that my improvement is not limited to the particular number shown. The inner wedge-bars 34 are tapered longitudinally, so that when they are in place on the carrier-plates their outer edges are, throughout their length, at the same distance from or parallel to the adjacent portion of the inner wall of the housing—that is, the outer edges of the inner wedge-bars, the inner edges of the outer wedge-bars, and the inside of the housing have the same taper; but while the tapering of the wedge-bars and housing longitudinally is an important feature of my construction it is not essential that the parts should be tapered exactly as described. It will be obvious, for instance, that the angle of the inclination of the outer edges of the bars 34 relative to the axis of the housing may be changed without materially affecting the construction.

As in my pending application aforesaid, when the inner wedge-bars are in place on the carrier-plates their outer wedge-shaped portions project into the spaces between the outer wedge-bars 19, the inner wedge-bars are adapted to be wedged in between the outer wedge-bars by the longitudinal movement of the wedge-block or of the carrier, or both, and when the inner and outer series of bars are wedged together they are moved longitudinally with the carrier-plates and wedge-block, and the inward or outward movement of the draw-bar is resisted by the friction between the surfaces of the inner and outer wedge-bars.

When the parts are in the positions shown in Fig. 1, the inner end of the extension 20 bears against shoulders 37 formed on the outer frame or casing, the follower-plate 24 bears against the shoulders 38 on the outer frame or casing, and the housing and follower-plate are held in these positions by the action of the springs 27 and 25, which at their inner ends bear against the carrier-plates 31 and against the wedge-block 26, respectively, and hold the carrier-plates, inner wedge-bars, and wedge-block 26 in the positions shown.

When the draw-bar 1 is moved inwardly, the follower-plate 24 is moved to the right, the spring 25 is compressed and forces the wedge-block 26 to the right, and as the wedge-block is moved to the right it slides on the inclined inner portions of the carrier-plates, forcing them radially outward and with them the inner series of wedge-bars 34. The wedge-block 26 moves inwardly relatively to the carrier-plates 31 until the inner wedge-bars 34 are tightly wedged between the outer wedge-bars, and when no further outward movement of the inner wedge-bars can be effected the wedge-block 26, the carrier-plates 31, and the inner wedge-bars 34 will be moved together to the right. The spring 27 will be compressed by the longitudinal movement of the carrier-plates to the right, and the longitudinal taper of the housing and of the wedge-bars will cause an additional wedging together of the bars as the inner wedge-bars are moved to the right. The friction between the rubbing-surfaces of the inner and outer wedge-bars, together with the compression of the spring 27, will absorb the momentum of the draw-bar and finally stop its inward movement.

When the draw-bar is relieved of the pressure which forces it inward, the parts will be returned to the positions shown in Fig. 1. The expansion of the spring 25 will move the draw-bar 1 and the follower-plate 24 outward until the follower-plate bears on the shoulder 38. The pressure of the spring 25 on the wedge-block and the radially outward pressure on the wedge-bars, which causes their outward wedging action, will be relieved or lessened, and the expansion of the spring 27 will move the carrier-plates and inner wedge-bars to the left into the positions shown in Fig. 1.

When the draw-bar 1 is moved outward by a pulling strain, the draft pin or bolt 22 is moved with it. The cotter 28 bears against the end of the extension 20 of the housing, and the housing is moved to the left, and at the same time both of the springs 25 and 27 are compressed. The resistance of the spring 25 tends to prevent motion of the wedge-block 26 to the left, and the pressure on the spring 27 moves the carrier-plates 31 and the inner wedge-bars 34 longitudinally to the left. As the carrier-plates are moved to the left, the wedging action between the wedge-block and the inclined surfaces 30 of the carrier-plates forces the inner wedge-bars radially outward and wedges them between the outer wedge-bars. The further movement of the draft-pin and the housing to the left will compress the springs 25 and 27. The wedge-block, carrier-plates, and the inner wedge-bars will be moved to the left until the ends of the carrier-plates bear against the follower-plate. The outer wedge-bars, which are formed integral with the housing, will be moved to the left against the frictional resistance between the surfaces of the inner and outer wedge-bars, and an additional wedging action between the inner and outer wedge-bars will be effected by the movment of the housing and outer wedge-bars due to the longitudinal taper of the housing and wedge-bars. After the carrier-plates have been moved into position to bear against the follower-plate 24 the spring 27 will con-

tinue to be compressed until the frictional resistance of the wedge-bars and the resistance to compression of the spring 27 are sufficient to stop the motion. When the pull on the draw-bar ceases, the parts will be returned to the positions shown in Fig. 1.

The angular relation of the frictional surfaces on the inner and outer wedge-bars is such that in whichever direction the force has been applied to move the draw-bar and to force the wedge-bars together the cessation of that force will permit a quick release of the wedge-bars and a discontinuance of the wedging action. It will be observed that when the draw-bar is actuated in either direction the movement is arrested by the combined action of the friction devices and the resistance of the springs, but when the actuating force on the draw-bar ceases the return movement of the parts is effected by the resilience of the springs only, and as only a part of the actuating force has been employed in compressing the springs the return movement of the parts is effected with comparatively little or no shock.

The operation of the apparatus has been described with reference to the action of a considerable force acting by impact or by pulling on the draw-bar, and it will be readily understood that some slight differences in the movements or in the order of the movements may occur under the action of widely-differing forces.

I claim as my invention and desire to secure by Letters Patent—

1. The combination, in a draw gear or buffing apparatus, of an integral housing, intercalated frictional devices within the housing, and means for pressing the frictional devices together, substantially as set forth.

2. The combination, in a draw gear or buffing apparatus, of an internally tapered housing formed of a single casting, intercalated frictional devices within the housing, and means for pressing the frictional devices together, substantially as set forth.

3. The combination, in a draw gear or buffing apparatus, of a series of rigidly connected frictional devices, relatively movable frictional devices adapted to engage therewith, and means for pressing the frictional devices together, substantially as set forth.

4. The combination, in a draw gear or buffing apparatus, of a series of rigidly connected frictional devices, relatively movable frictional devices adapted to engage therewith, means for pressing the frictional devices together, and means whereby either set of frictional devices may be moved relatively to the other, substantially as set forth.

5. The combination, in a draw gear or buffing apparatus, of a housing, frictional devices formed on the housing and adapted to engage with other frictional devices which are movable relatively to the housing, and means for pressing the frictional devices together, substantially as set forth.

6. The combination, in a draw gear or buffing apparatus, of an integral housing, frictional devices formed on and integral with the housing, and adapted to engage frictional devices which are movable relatively to the housing, and means for pressing the movable friction devices into contact with the frictional devices on the housing, substantially as set forth.

7. The combination, in a draw gear or buffing apparatus, of a single integral casting comprising a movable housing with frictional surfaces formed thereon, frictional devices inside of the housing which are adapted to engage with the frictional surfaces on the housing, means for pressing the inner frictional devices outwardly against the surfaces on the housing, and means whereby the housing, the inner frictional devices, or both may be moved longitudinally, substantially as set forth.

8. The combination, in a friction mechanism of an outer series of wedge bars, an inner series of wedge bars, carriers for the inner series of wedge bars, integral wedge bars formed on the carriers, integral sets or groups of wedge bars loosely connected to the carriers, and means for pressing the inner and outer series of wedge bars together, substantially as set forth.

9. The combination, in a draw gear and buffing apparatus, of a housing, longitudinally tapered wedge bars formed on the housing, longitudinally tapered wedge bars within the housing which are adapted to engage the wedge bars which are formed on the housing, and means for pressing the wedge bars together, substantially as set forth.

In testimony whereof I have hereunto set my hand.

GEO. WESTINGHOUSE, JR.

Witnesses:
W. D. WEBB,
J. SNOWDEN BELL.