No. 683,236. Patented Sept. 24, 1901.

J. M. WAUGH.

DRAFT RIGGING FOR CARS.

(Application filed Feb. 16, 1901.)

(No Model.)

Fig 1

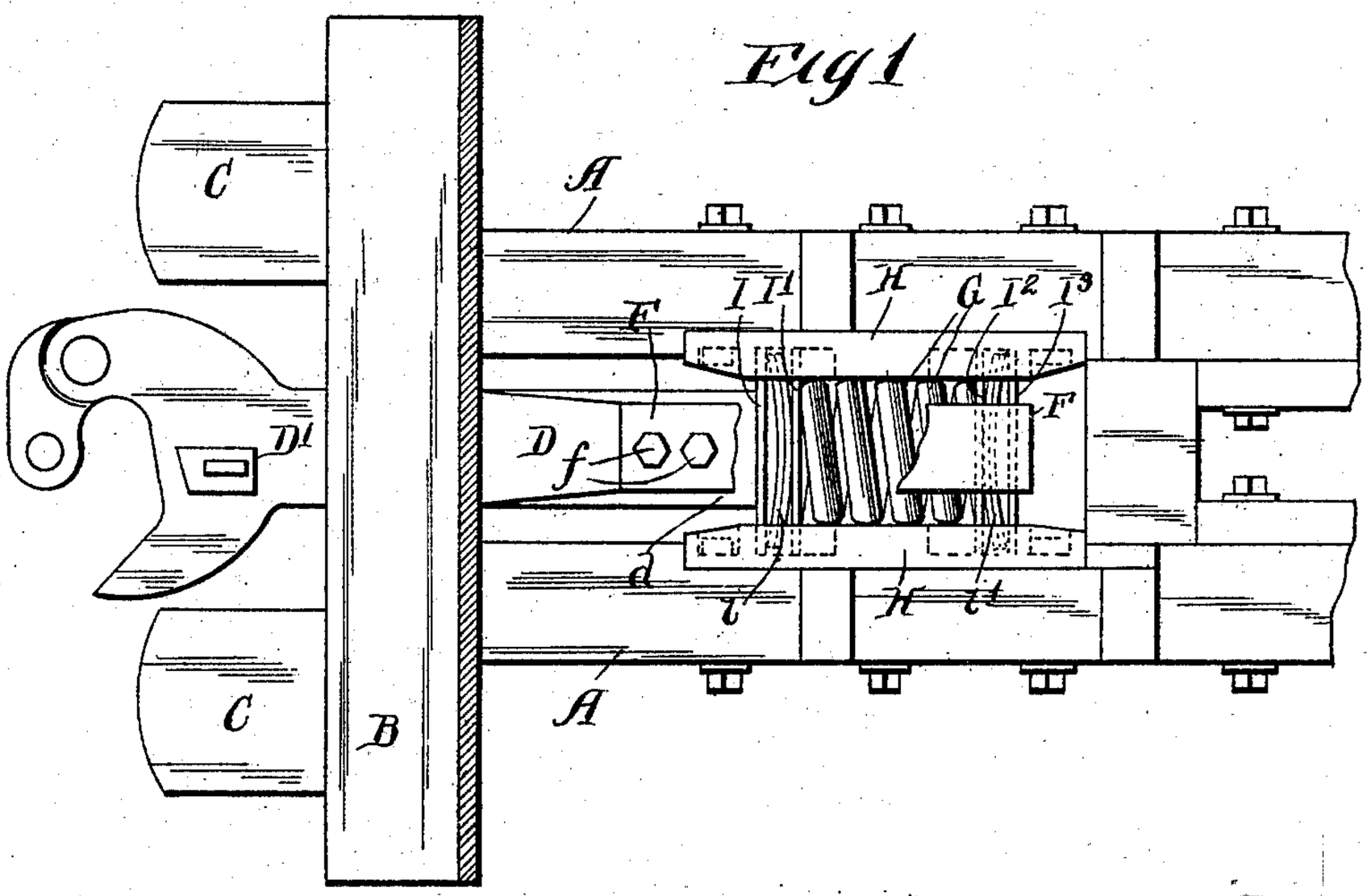


Fig 2

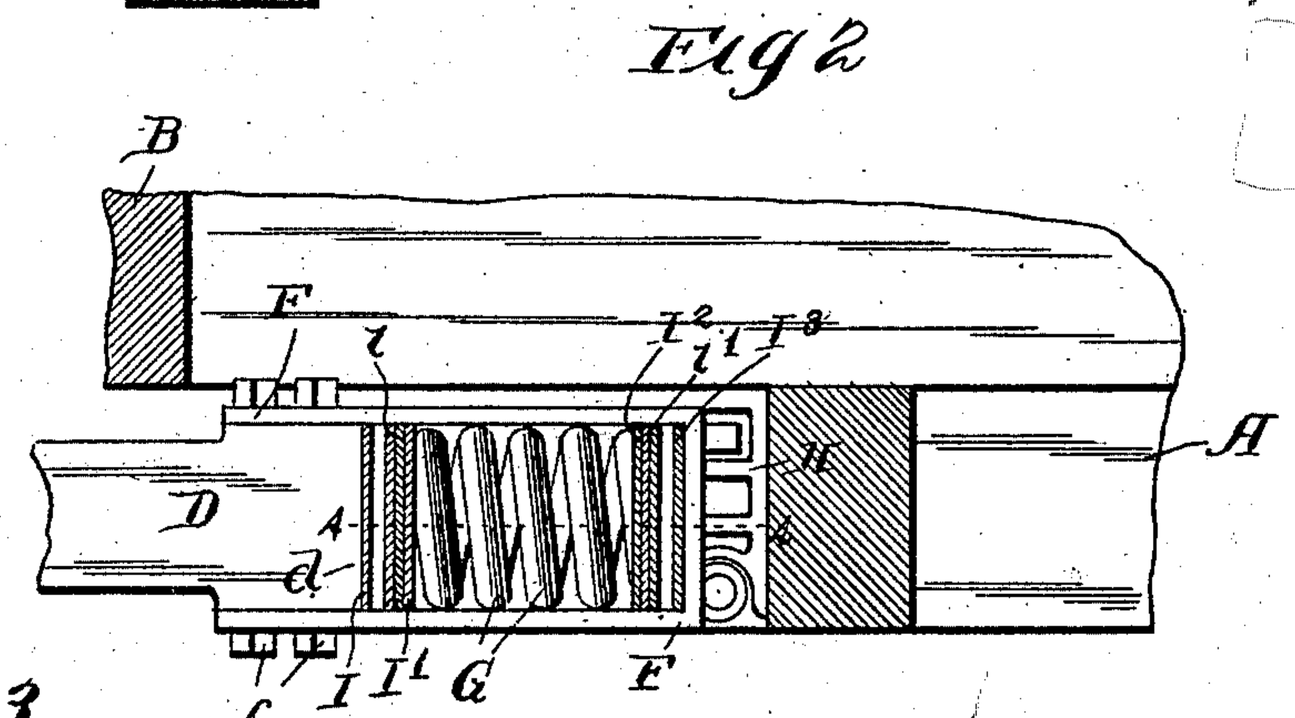


Fig 3

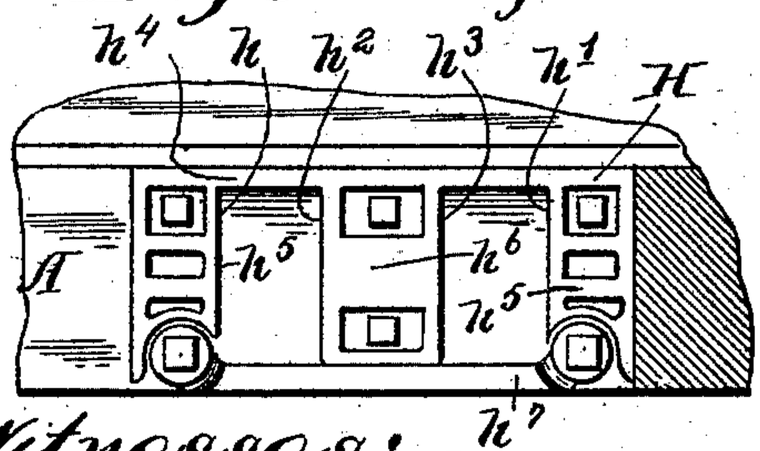
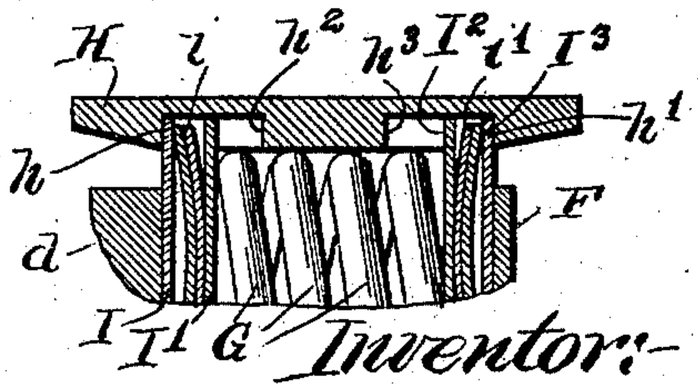


Fig 4



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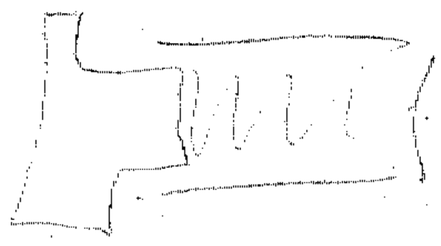

DRAFT-RIGGING FOR CARS.

SPECIFICATION forming part of Letters Patent No. 683,236, dated September 24, 1901.

Application filed February 16, 1901. Serial No. 47,663. (No model.)

To all whom it may concern:

Be it known that I, JAMES MILTON WAUGH, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Draft-Rigging for Cars; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to coupling devices for railway-cars, and more especially to the connections between the draft-bar, follower-plates, and draft-sills, by means of which a cushioned graduated resistance to the shocks of coupling and usage is obtained.

The invention relates more especially to the matters hereinafter set forth, and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a plan view showing the end portions of the draft-sills and the end cross-sill of a car with the floor removed and parts broken away, said car being fitted with a draft-rigging embodying the salient features of my invention. Fig. 2 is a view in detail, partially in section and partially in elevation, of a draw-bar, yoke, springs, follower-plates, and draft-irons of said rigging. Fig. 3 is a view in detail of a draft-iron plate. Fig. 4 is a sectional view on line 4 4 of Fig. 2, showing the engagement of the springs and follower-plates with the draft-iron plates and draw-bar yoke.

Referring to the drawings, A A represent the end portions of the draft-sills of an ordinary car, the car-flooring being removed to show the same. Said sills carry at their outer ends a cross-sill B, provided, as usual, with deadwoods C. A draw-bar D is located centrally between the draft-sills A, its outer or draw head D′ being supported below the end sill B by a stirrup-iron (not shown) in the usual manner. The inner end *d* of the draw-bar is secured to a yoke F, said yoke, as herein shown, being formed of a piece of strap-steel folded between its ends, which are made to overlap the inner end of the draw-bar D and are secured thereto by bolts *f*, which pass through said yoke end and draw-bar ends. A coiled spiral spring G is located between the draft-sills and between the arms of the yoke, being held against vertical displacement by said arms. At each end of the spring G is located a set of transversely-arranged spring-steel follower-plates, the follower-plates constituting the set at the outer or forward end of the spring G being indicated by the letters I, I′, and *i* and those of the set at the inner or rear end of the said spring G being indicated by I^2, I^3, and *i*′. The draft-sills are provided with outer forwardly and rearwardly facing shoulders *h h*′, adapted for engagement therewith of the exterior straight follower-plates I and I^2, and also with inner or intermediate forwardly and rearwardly facing shoulders h^2 h^3, located in position for contact with the ends of the straight follower-plates I′ and I^3. As herein shown, said shoulders are formed on draft-irons H H, attached to the inner faces of the draft-sills. Said draft-irons may be of any convenient pattern, but are shown in the drawings as having the form of ribbed and flanged plates, which are secured by bolts and mortises to the inner faces of the draft-sills A. Said plates H are each provided with an upper horizontal flange h^4 and with vertical ribs h^5 h^6, which form recesses on the inner faces of said plates and the side faces of which constitute the shoulders *h*, *h*′, h^2, and h^3. Horizontal bars h^7 are removably secured along the lower margins of said plates by bolts or other suitable means and form horizontal supporting-surfaces at the bottoms of said recesses. Said draft-irons, as herein shown, are similar to those described in Letters Patent No. 439,751, for draw-bar attachments, issued June 27, 1893, to James A. Hinson, and are not claimed as a feature of this invention. The spring-steel follower-plate I is straight or flat and extends between the arms of the yoke F, so as to bear at its middle portion against the perpendicular face of the end *d* of the draw-bar D. The ends of said follower-plate project beyond the margins of the yoke-arms and are adapted to engage the rearwardly-facing shoulders *h*, formed by the outer perpendicular ribs h^5 of the draft-irons H. A similar follower-plate I′ is likewise located in the yoke so as to bear with its middle portion against the outer end of the spiral spring G, with its ends extending into position to engage the forwardly-facing shoulders h^2 on

the intermediate ribs h^6. Between the two follower-plates I I′ are located two or more steel follower-plates i, which are of curved form and arranged with their convex sides or crowning faces toward the center of the car, so that their outer ends bear against the outer follower-plate I and their crowns abut against the central portion of the inner follower-plate I′. At the inner end of the spring G the follower-plate I^2, which is straight and similar to the straight plates already described, is positioned so as to bear at its central portion against the bent or vertical portion of the yoke F and with its projecting ends in position to engage the forwardly-facing shoulders h' on the ribs h^5 of the draft-irons. The follower-plate I^3 is also so placed that its central portion bears against the inner end of the coiled spring G or that nearer the bent portion of the yoke, and its ends project into the recesses of the draft-iron in position to engage the rearwardly-facing shoulder on the innermost rib h^6 of the same. The curved follower-plates i' are inserted between the follower-plates I^2 I^3, their crowning faces bearing against the flat follower-plate I^2, which abuts against the inner end of the coiled spring G, and their outer ends abutting against the other follower-plate I^3. By this arrangement the inner or yoke end of the draw-bar is held in alinement with the center line of the car, while allowed longitudinal movement through the yielding of the spring G and the spring follower-plates.

The action of the device is as follows: When the draw-bar D is forced toward the center of the car by the shock of coupling, its end thrust is conveyed through the flat follower-plate I, the curved plates i, the inner follower-plate I′, the spiral spring G, the plate I^3, and the curved plates i' to the flat follower-plate I^2 and thence to the forwardly-facing shoulders h'. If the pressure increases until the spiral spring G is compressed to its limit, then the front plate I will be bent inwardly toward the curved plates i and finally brought into contact with the same, the said curved plates i being at the same time slightly straightened by reason of the pressure on their ends of said flat plate I. At the same time the rear curved plates i' between the follower-plates I^2 I^3 will be more or less flattened, and if the pressure be sufficiently great they will finally bear throughout their entire length against the rear follower-plate I^2. Moreover, when the spiral spring has been compressed to its limit of compression the flat plate I′ will be brought into contact at its ends with the forwardly-facing intermediate shoulders h^2, and said plate I′ will be bent into curved form at the same time that the rear curved plates i' are being straightened, so that the inward movement of the draw-bar is at this time resisted by the combined action of said curved plates i' and the straight plate I′. Should the shock be so great as not to be completely absorbed or overcome by the compression of the spring G and flattening of said curved plates i' and curving of the flat plate I′, the said flat plate I′ will be brought into contact at its ends with the forward curved plates i, and the straight plate I^3 will also be brought into contact at its ends with the ends of the then straightened curved plates i', so that further inward movement of the draw-bar will be resisted by all of the plates of both sets, which, however, being resilient, will afford a slightly-yielding resistance to prevent undue shock or jar when resisting the greatest pressure to which they may be subjected. From the above it will be seen that a graduated spring resistance is obtained in opposition to the shock of coupling, which increases until the shock is completely absorbed or else gradually transmitted to the draft-sills. Manifestly, the straight plate I^2 and all of said straight plates act to prevent the bending or yielding of the curved plates to such an extent as to reverse their curvature, which would tend to break them, the straight plates acting to give the required slight cushioning effect when the curved plates have been straightened under a maximum pressure. It is obvious that a sudden pull, such as commonly arises in the middle of the train when passing over the top of a grade, will also be gradually taken up and conveyed to the draft-sills of the car in a similar manner, the follower-plates coming into action in reverse order to that described above. It will also be understood that any number of curved spring-plates may be inserted between the flat follower-plates, and as the coiled spring G and the spring-plates may be graduated to receive any pressure it follows that a cushioned resistance may be obtained suitable for any conditions arising in practice. When a single spring is used or a series of springs which are brought simultaneously into action, the modulus of elasticity thereof is practically constant—that is, the power of the spring or springs to overcome the compressing force does not increase as the spring is compressed. As a consequence a power greater than the resistance of the spring or springs merely brings about full compression, and the excess force is transmitted abruptly to the device which retains the spring or springs, and thence to the draft-sills, with a shock which is extremely dangerous to the parts. By the use of the device herein described this excess shock is taken up gradually, more and more springs being brought into action and a cumulative resistance being afforded, which increases under ordinary conditions of use until all excess shocks are either completely absorbed or else gradually transmitted to the rigid connections. For instance, the coiled spring G as commonly adjusted is capable of taking up the thrust of, say, twenty thousand pounds before complete compression takes place. If a shock of fifty or sixty thousand pounds be imparted to it, as by a sudden stop or taking

up of slack in a train due to changes of grade, it is plain that an excess of force of thirty or forty thousand pounds is abruptly communicated through the completely-compressed spring to its rigid connections, which thereby are frequently fractured or otherwise permanently injured. By the interposition of the flat follower-plates separated by the curved follower-plates between this coiled spring and the draft-sill connections a cushioned resistance is obtained, which gradually increases in proportion to this excess force and which prevents any sudden shock or blow upon the draft-sills and draft-iron fastening, so that a minimum of breakage and wear ensues. In other words, a spring resistance is obtained to all strains which are imparted to the draw-bars, which increases gradually until said strains are completely absorbed or else as gradually communicated to the draft-sills. It also follows that the recoil of a combination of spring elements such as is herein shown, where successively-acting members each have a different extent of movement, must be in great part overcome. The flat or straight plates on release from pressure move a very short distance and give only a small forward impetus to the moving parts in the recoil, and as the curved plates, which have a greater movement in the recoil, act with much less force than the combined plates they do not throw the parts forward with such violence in the concluding part of their recoil movement as would all of the plates acting together.

It will be understood that my invention is not limited to the specific features of construction illustrated in the accompanying drawings except as set forth in the appended claims.

I claim as my invention—

1. A draft-rigging comprising draft-sills provided with opposite shoulders, a draw-bar, a coiled draw-bar spring, a straight follower-plate engaged at its middle with the draw-bar and adapted for contact at its ends with said shoulders, and a curved follower-plate interposed between the said flat plate and the end of the said coiled spring.

2. A draft-rigging comprising draft-sills provided with opposite forwardly and rearwardly facing shoulders, a draw-bar, a coiled draw-bar spring, two straight follower-plates which engage the draw-bar and are adapted to bear against the said shoulders, and curved follower-plates interposed between the ends of the coiled spring and the said straight follower-plates.

3. A draft-rigging comprising draft-sills provided with opposite shoulders, a draw-bar, a straight follower-plate, the ends of which are located in position to engage the said shoulders, a second straight follower-plate located in contact with the end of said coiled spring and one or more curved follower-plates interposed between the said straight follower-plates.

4. A draft-rigging comprising draft-sills provided with forwardly and rearwardly facing shoulders, a draw-bar, a coiled draw-bar spring, and two sets of spring follower-plates interposed between the draw-bar and the ends of the said coiled spring, each of said sets of plates embracing a flat follower-plate located in contact with the draw-bar, with its ends in position to engage the shoulders on the draft-sill, a second flat follower-plate located in contact with the end of the coiled spring, and curved follower-plates interposed between said straight follower-plates.

5. A draft-rigging comprising draft-sills provided with outer and intermediate forwardly and rearwardly facing shoulders, a draw-bar, a coiled draw-bar spring, and two sets of spring follower-plates, each set comprising two flat plates and a curved plate or plates interposed between said flat plates, the outer flat plate of each set being adapted for contact with the outer shoulders of the draft-sills, and the inner flat plate of each set being adapted for contact at their ends with the intermediate shoulders on the draft-sills.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 14th day of February, A. D. 1901.

JAMES MILTON WAUGH.

Witnesses:

C. CLARENCE POOLE,

WILLIAM L. HALL.