No. 690,683. Patented Jan. 7, 1902.

J. M. WAUGH.

DRAW BAR DRAFT RIGGING FOR CAR COUPLINGS.

(Application filed May 17, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

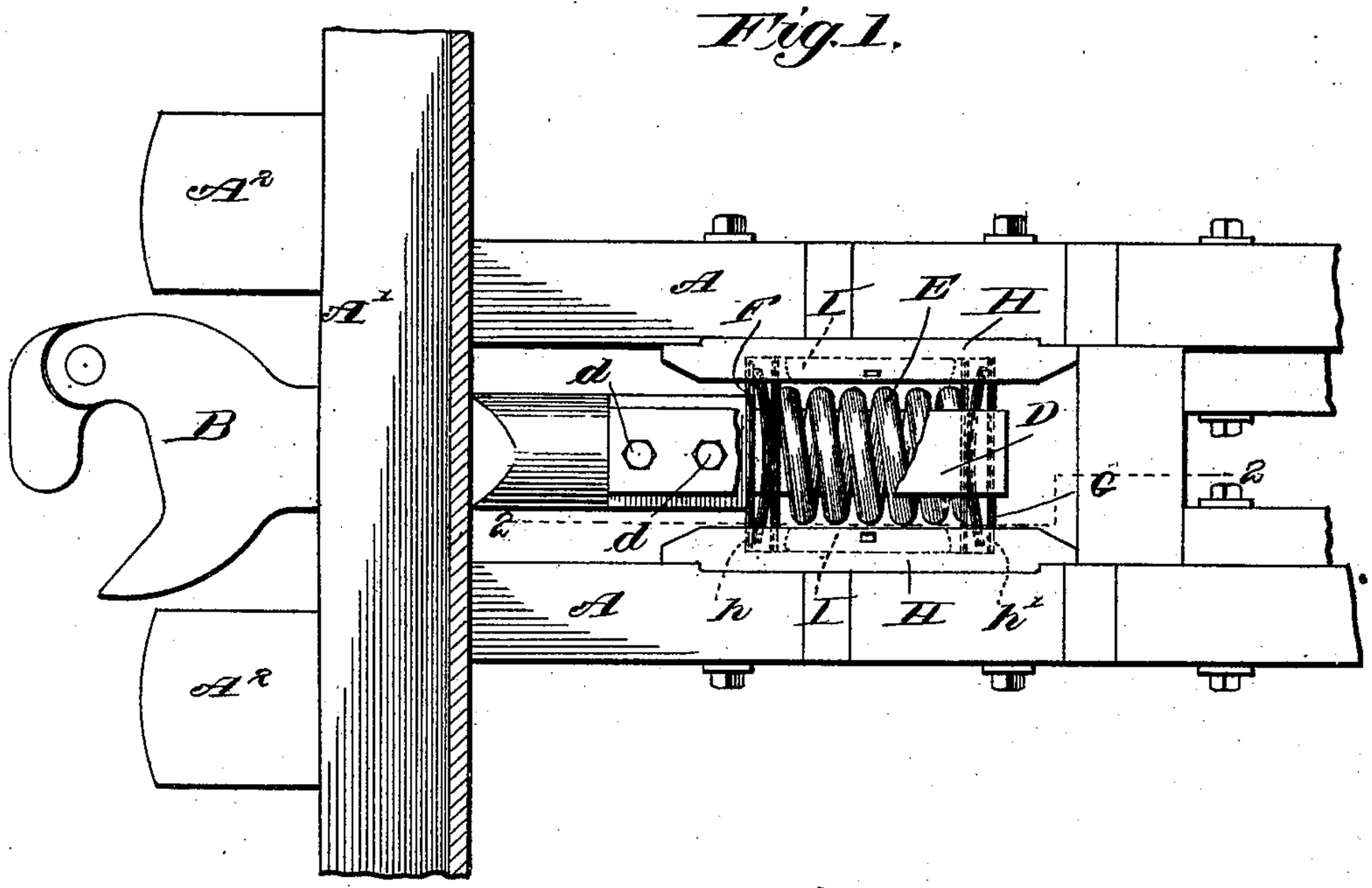


Fig. 2.

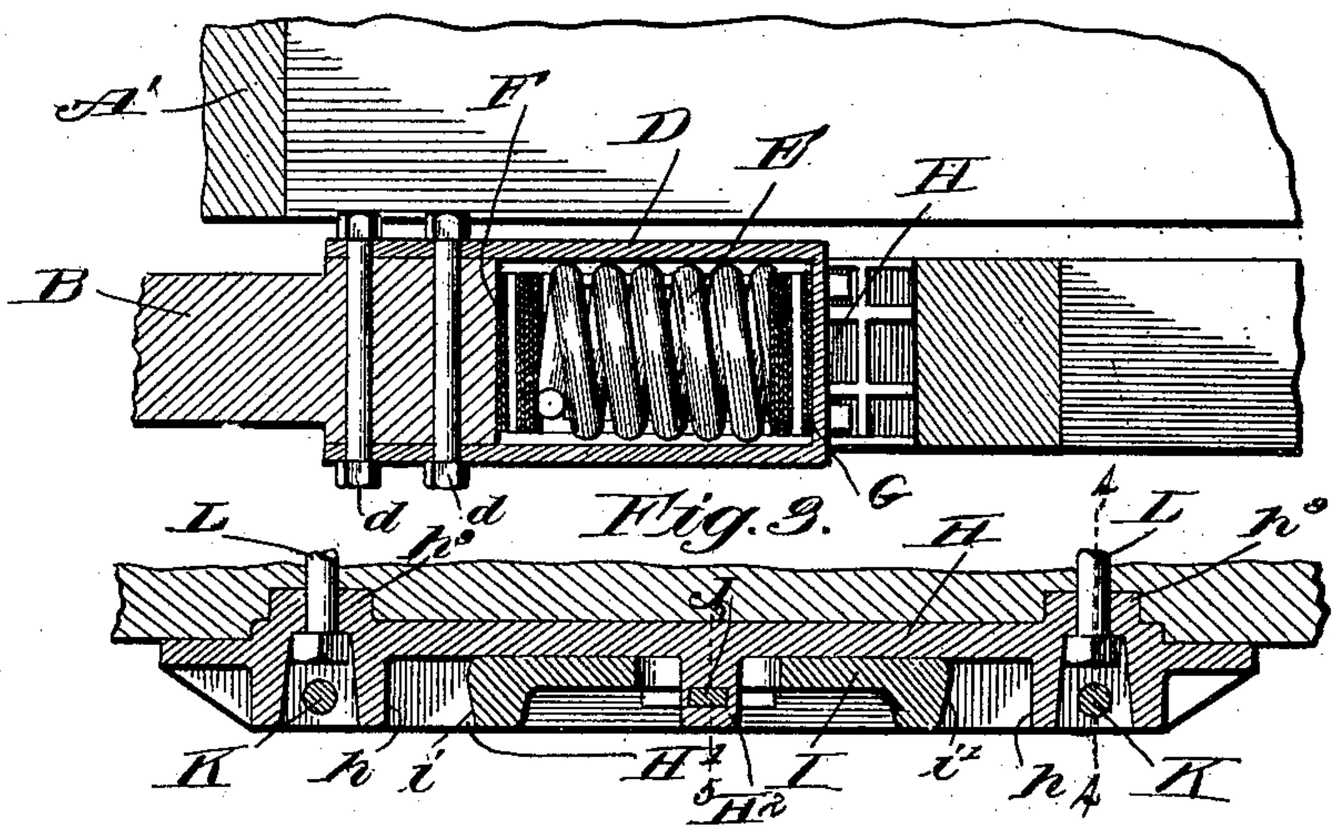


Fig. 3.

Fig. 4.

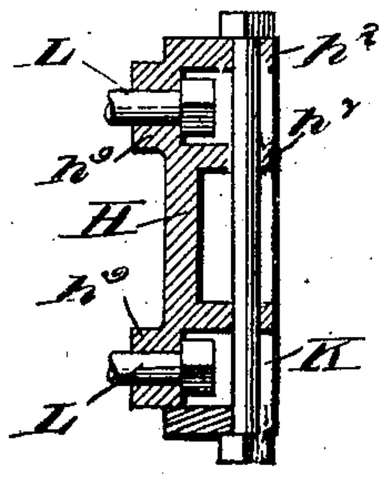
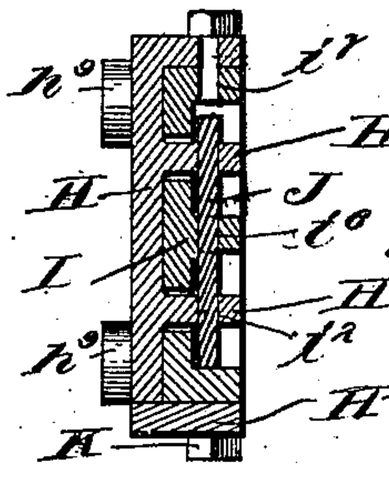


Fig. 5.



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C. H. Crawford

Inventor:
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DRAW BAR DRAFT RIGGING FOR CAR COUPLINGS.

(Application filed May 17, 1901.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 7.

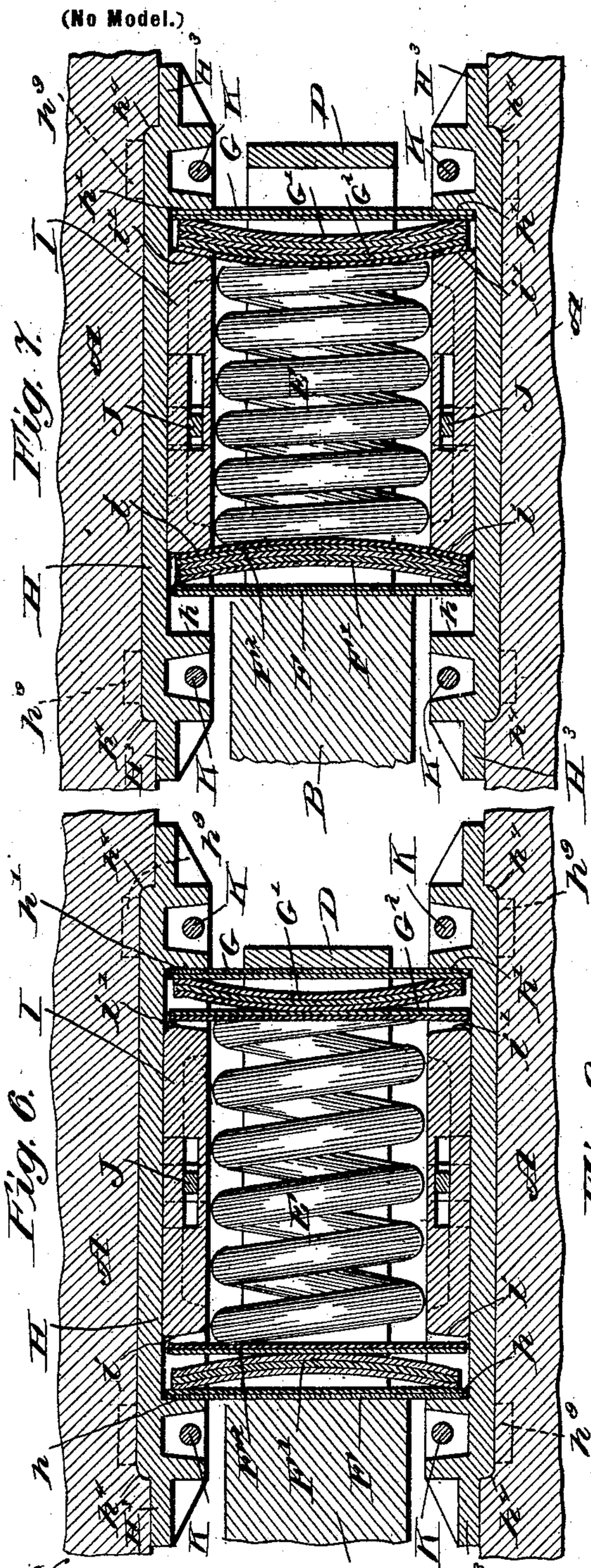

Fig. 9.

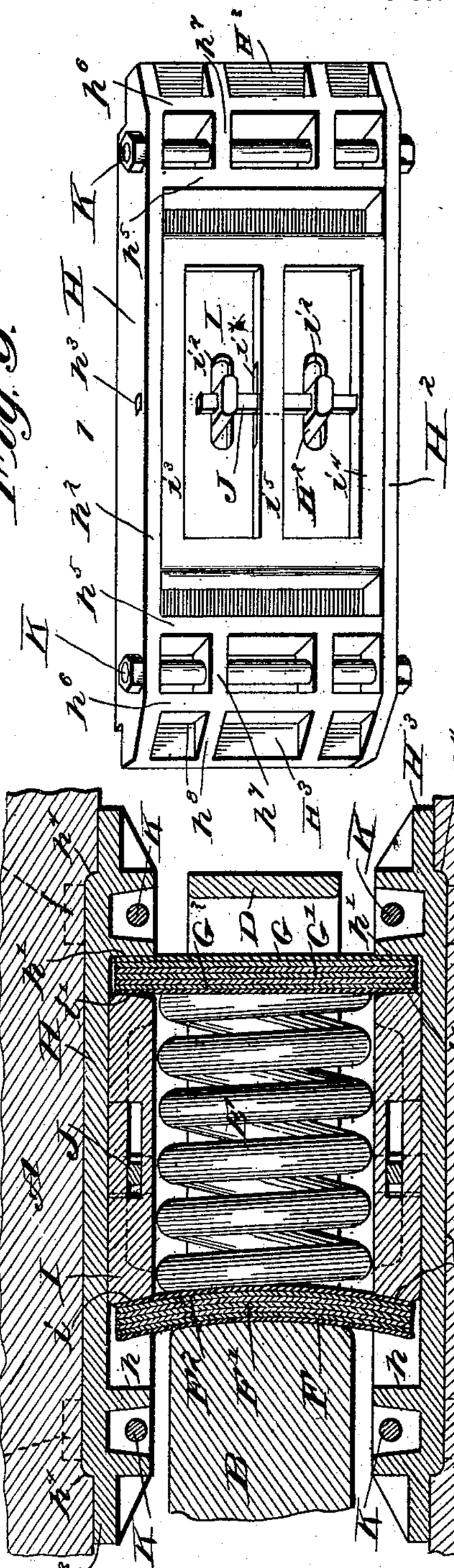

Fig. 6.

Fig. 8.

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UNITED STATES PATENT OFFICE.

JAMES MILTON WAUGH, OF CHICAGO, ILLINOIS.

DRAW-BAR DRAFT-RIGGING FOR CAR-COUPLINGS.

SPECIFICATION forming part of Letters Patent No. 690,683, dated January 7, 1902.

Application filed May 17, 1901. Serial No. 60,685. (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 Draw-Bar Draft-Rigging for Car-Couplers; 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 and draft-sills, whereby a cushioned graduated resistance to the shocks occurring in coupling or due to variable strains in traction is obtained.

The present invention relates more particularly to that class of connecting devices between draw-bars and the draft-sills of cars such as is illustrated in my prior application, Serial No. 47,633, filed February 16, 1901, wherein a coiled draw-bar spring is used in connection with follower-plates which engage the end of said spring and opposite shoulders on the draft-sills.

The invention consists in the matters hereinafter described, and pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a plan view showing the end portions of the draft-sills and the end cross-sill of the car with the floor removed and parts broken away, said car being fitted with a draft-rigging embodying my invention. Fig. 2 is a longitudinal section of the same, taken on line 2 2 of Fig. 1. Fig. 3 is a detail longitudinal horizontal section of one of the draft-irons. Fig. 4 is a detail cross-section taken on line 4 4 of Fig. 3. Fig. 5 is a detail cross-section taken on line 5 5 of Fig. 3. Figs. 6, 7, and 8 are views, on an enlarged scale, illustrating in horizontal section the main parts of the device and showing changed positions of the same. Fig. 9 is a perspective view of one of the draft-irons.

Referring to the said drawings, A A indicate 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 A′, provided, as usual, with dead-woods A^2.

B indicates a draw-bar, which is located centrally between the draft-sills, its outer end or draw-head B′ being supported below the end sill by a stirrup-iron (not shown) in the usual manner. The inner end of the draw-bar is provided with a yoke D, said yoke being formed, as herein shown, by a bar of steel folded between its ends into U form, and the ends of which overlap the inner end of the draw-bar and are secured thereto by bolts *d*. A coiled spiral spring E is located between the draft-sills and between the arms of the yoke, being held from vertical displacement by the said arms. At each end of the spring E is located a set of transversely-arranged spring-steel follower-plates, the follower-plates constituting the set at the outer or forward end of said spring being indicated by the letters F F′ F^2 and those at the inner or rear end of said spring being indicated by the letters G G′ G^2. The draft-sills are provided with outer forwardly and rearwardly facing shoulders *h h′*, adapted for engagement therewith of the exterior straight follower-plates F and G, and on said sills are mounted two horizontally-sliding abutment-plates I I, the ends of which form rearwardly and forwardly facing shoulders *i i′*, adapted for contact with the ends of the inner straight follower-plates F^2 G^2. As herein shown, the shoulders *h h′* are formed on draft-irons H H, attached to the inner faces of the draft-sills, and the sliding plates I I are movably supported by and adapted to slide on the said draft-irons H H. So far as certain principal features of the invention are concerned, said draft-irons may be made of any suitable or desired form or construction. The draft-irons illustrated, however, in themselves embody certain novel features of construction, and the same, together with the sliding plates I I, are constructed as follows: Said draft-irons are shown in the drawings as having the form of recessed or flanged plates, which are secured by bolts and mortises to the inner faces of the draft-sills A. Said plates H H are each provided with an upper horizontal flange h^2 and vertical ribs h^5 h^5, which form, with said horizontal flange and a separate horizontal bottom plate H^2, recesses in which the ends of the follower-plates are located and within which the sliding abutment-plates I are in-

serted and adapted to slide. The inner faces of the vertical ribs h^5 h^5 constitute the inwardly-facing shoulders h h', hereinbefore referred to. The horizontal bars H′ are shown as removably secured along the lower margins of said plates, so as to form horizontal supporting-surfaces at the bottom of said recesses, said plates H′ being adapted to support the ends of the follower-plates when the same are in place within the recesses of the draft-irons and by being romovable enabling said follower-plates to be easily dropped out of their places when the said bars H′ are detached. Provision is made for holding or confining the sliding plates I in contact with the draft-irons, while at the same time permitting free endwise movement of said plates, consisting of integral lugs H^2, cast on the inner faces of the draft-irons and projecting through horizontal slots i^2, formed in the plates I. In connection with said studs suitable provision is made for confining the plates I in contact with the draft-irons, the same, as herein shown, consisting of vertical bars or keys J, inserted through the lugs H^2 in such manner as to bear against the inner faces of the plates I.

As herein shown, the sliding abutment-plates are recessed to give lightness, being provided with two marginal horizontal or longitudinal ribs i^3 i^4 at the top and bottom edges thereof and an intermediate horizontal rib i^5, said ribs extending between and connecting the end portions of the plate, which are made of considerable thickness to give the requisite strength and to form bearing-surfaces of suitable width for engagement with the ends of the follower-plates. In connection with this ribbed form of plate provision is made for inserting and holding in place the key J by providing a longitudinal slot i^6 in the intermediate rib and an aperture i^7 in the upper rib, through which the key J may be inserted, said key when inserted through the lugs I^2 resting at its lower end upon the lower rib i^4, so that it is held in place by gravity. A hole h^3, Figs. 5 and 9, will also be formed in the upper horizontal flange h^2 of the draft-irons in order to enable the key J to be inserted into its place in the lugs H^2 H^2.

As before stated, the draft-irons fit within mortises in the inner faces of the draft-sills, and in order to provide a strong and durable connection of the said draft-irons with the sills I employ the following construction: At the ends of the draft-irons the same are provided with shoulders h^4 h^4, which bear against the ends of the mortises in the draft-sills, and on the extremities of the plates are formed longitudinally-extending flanges H^3, which are adapted to extend over the inner surfaces of the draft-sills adjacent to the ends of said mortises. The draft-irons are held against the draft-sills by suitably-applied bolts L L, of which any desired number may be used, but of which four are shown, two at each end of the draft-irons. The purpose of the flanges H^3 is to prevent the splitting of the wood at the ends of said mortises by endwise pressure of the draft-irons against the shoulders thereat, it being obvious that the said flanges H^3 when the draft-irons are bolted securely to the draft-sills act to confine the wood adjacent to the mortises, so as to lessen the liability of splitting of the wood at these points. It is found, moreover, that such splitting of the wood at the end of the mortises is liable to begin at the angle or corner where the end face or shoulder of the mortise joins the rear surface thereof, and as a further means of avoiding the liability of splitting at these points I make of rounded or convex form the angles or corners wherein the shoulders h^2 join the rear faces of the draft-irons, and I make the mortises correspondingly rounded at their corners, this construction providing concave surfaces or fillets at the inner angles of the mortises, by which liability of the wood splitting at the ends of the mortises is greatly lessened.

In order to stiffen and strengthen the ends of the draft-irons and the flanges H^3 thereon, outer vertical ribs h^6 are shown as formed on the said draft-irons parallel with the ribs h^5, said ribs h^5 h^6 being cast integral with the upper flange h^2, which is extended outwardly to the outer edge of the flange H^3, and intermediate horizontal ribs h^7 are arranged to extend from the ribs h^5 to the ribs h^6 and are continued in the form of triangular ribs h^8, which extend from said ribs h^6 to the outer edges of the flanges H^3. In connection with this construction in the ends of the draft-irons provision is made for detachably securing the lower horizontal bar H^2 thereto, consisting of vertical bolts K, which are inserted through apertures formed in the upper flange h^2 and through the horizontal flanges h^7 h^7 at points intermediate the vertical flanges or ribs h^5 h^6. The bolts L are shown as inserted through the end portions of the draft-irons inside of the shoulders h^4 h^4 and as provided with heads, which are seated in the bottoms of the recesses formed between the vertical ribs h^5 h^6, above and below the horizonal ribs h^7 h^7, and in order to afford room for the vertical bolts K said bolt-heads are sunk in deep recesses formed to receive them, and the draft-iron is provided on its rear face with inwardly-projecting bosses h^9 to provide for said recesses and to give sufficient thickness to the metal at points where the bolts pass through the draft-iron.

Now referring more specifically to the construction and arrangement of the several follower-plates and the manner in which the same operate in connection with the sliding abutment-plates I I, the same will be understood from the following: The drawings show each set of follower-plates as consisting of two outer plates, three intermediate curved plates, and two inner plates; but a greater or less number of plates may be used in each in-

stance, according to the stiffness of the plates and other circumstances. The exterior plates F G are straight or flat and bear at their outer ends against the outermost shoulders *h h'* of the draft-irons. The intermediate parts of the plates F bear against the inner end of the draw-bar, while the intermediate portions of the plates G bear against the inner vertical part of the yoke D. The innermost plates F^2 G^2 are straight and bear at their intermediate parts against the ends sf the spring E, while the end portions of said plates F^2 G^2 are adapted to bear against the opposite ends of the sliding abutment-plates I. The intermediate plates F' are made of curved form and arranged with their convex sides or crowning-faces toward the center of the car, so that they bear against the central part of the innermost plates F^2, while their ends bear against the outer extremities of the external straight plates F. Similarly the plates G', located between the plates G G^2, are curved and are arranged with their convex surfaces or crowning-faces toward the end of the car, so as to bear against the inner end of the draw-bar spring E with their ends in bearing against the extremities of the outermost flat plates G.

Generally the flat and curved follower-plates above described are arranged in the same manner as the corresponding follower-plates illustrated in my said prior application, filed February 16, 1901. The follower-plates illustrated in said application, however, operate in connection with stationary shoulders on the draft-sills, while in this instance said plates are operated in connection with the longitudinally-sliding abutment-plates I, which are adapted to shift or move endwise on said sills. The operation of the said follower-plates in connection with the said sliding abutment-plates is as follows: The natural or normal position of the parts is shown in Fig. 6, wherein the outer flat plates F and G are held in contact with the draw-bar and shoulders *h h'* by the draw-bar spring, while the ends of the innermost plates F^2 G^2 are a short distance from the ends of the abutment-plates. The parts being in this position 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-plates F, the curved plates F', and the flat plates F^2, the spiral springs E, the flat plates G^2, and the curved plates G', and the flat plates G to the forwardly or outwardly facing shoulders *h'* on the sills. After the spiral spring E has been compressed to some extent the ends of the innermost flat plates F^2 of the outermost set come in contact with the adjacent ends of the sliding abutment-plates I I, with the result of forcing or moving said plates endwise and bringing them into contact with the flat plates G^2 of the innermost set of plates. Thereafter said plates F^2 G^2 are bent or flexed until they are brought in contact at their ends with the intermediate curved plates F' G'. This position of the parts is shown in Fig. 7, from which it will be seen that during the movement of the parts from the time the said innermost flat plates F^2 G^2 are brought into contact with the sliding or abutment plates the inner movement of the draw-bar will be resisted not only by the tension of the spring E itself, but also by the resistance afforded by the bending of the said plates F^2 and G^2. If, after the parts are brought into the position shown in Fig. 7, inward pressure on the draw-bar, due to the shock of coupling, is sufficient to still further bend the plates and is greater than will be absorbed by the resistance of the flat plates F^2 and G^2, the intermediate or curved plates G' at the inner end of the draw-bar yoke will be flattened or straightened out until they come in contact with the flat plates G, while at the same time the outermost flat plates F will be bent inwardly or curved until brought against the concave surface of the outermost curved plates F', when the parts will have assumed the position shown in Fig. 8. At this time further inward movement of the draw-bar will be resisted by the combined action of all of the plates, which will be in contact with each other and will unitedly resist the inward stress on the draw-bar. When the several plates are thus brought into contact with each other, they are intended to withstand the greatest inward pressure to which the draw-bar may be subjected, although, by reason of the fact that a number of plates are employed and that they still have some degree of resiliency or capacity for yielding under strain, they will still present to some degree a cushioned resistance to the inward movement of the draw-bar. In the outward movement of the draw-bar, such as occurs when the train is starting or under similar conditions, the movements before described will be reversed, the yoke in such case acting against the flat plates G and tending to bring the outermost plates F' F^2 against the inwardly-facing shoulders *h h*.

From the above description of the action of the several flat and curved plates in connection with the moving or sliding abutment-plates I it will be obvious that the device as a whole affords a graduated resistance to sudden and severe shocks or strains acting on the draw-bar in either direction. Manifestly at the beginning of the inward movement of the draw-bar the movement will be resisted by the draw-bar spring E only. When the sliding or movable abutment-plates are in contact with both sets of flat plates F^2 G^2, the movement of the draw-bar will be resisted by the said plates F^2 G^2, in addition to that of the spring, and after the said plates F^2 G^2 have been brought into contact with the curved plates further movement will be resisted by the said curved plates at one end of the spring and by the flat exterior plate F or

G at the opposite end thereof. It will also be apparent that after the abutment-plates I I have carried the flat plates F^2 or G^2 into contact with the convex side of the curved plates upon further continuance of the pressure the endwise movement of the said abutment-plates tends to press the ends of the innermost plates F^2 or G^2 against the outer ends of the curved plates F′ or G′, and as the latter are then in contact with the outermost flat plates said ends of the curved plates will be clamped or confined between the innermost and outermost flat plates, as clearly shown in Fig. 7, with the result of producing a large amount of frictional resistance to the endwise movement of the end portions of the curved plates, and as the ends of the said curved plates must necessarily move apart or spread endwise in the straightening of the plates such frictional resistance to the outward movement of their ends will greatly increase the resistance to the straightening of the said curved plates, and thus afford additional resistance to the endwise movement of the draw-bar.

From the above it will be seen that not only do the follower-plates arranged in connection with the sliding or endwise-moving abutment-plates operate to afford a graduated spring resistance in opposition to the shock of coupling, or the shock which occurs in the starting of a train, but a very greatly increased resistance will be afforded at the time the draw-bar reaches the inward or outward limit of its movement, and the final arrest of the movement of the draw-bar will be accompanied by a yielding resistance operating to gradually transmit to the draft-sills exceptionally powerful or severe shocks brought upon the draw-bar.

Manifestly the operation of the parts above described will be the same when each set of follower-plates consists of a single outer plate F or G, a single inner plate F^2 or G^2, and a single intermediate or curved plate F′ or G′. Moreover, so far as the action of the sliding abutment-plates is concerned, advantageous results will be obtained if the inner and intermediate plates F^2 F′ and G^2 G′ alone are used, it being obvious that the general result obtained in this case will be the same as before described, except that the additional degree of graduated resistance afforded by the outermost straight plates F and G will be lacking.

In order to enable the sliding abutment-plates I to be made of sufficient stiffness and strength at their ends which are engaged with the spring follower-plates, while at the same time permitting suitable flexure in the end portions of said plates, the ends of said follower-plates are beveled or inclined inwardly and also preferably rounded on their inner edges in the manner shown in the drawings.

I claim as my invention—

1. A draft-rigging comprising draft-sills provided with inwardly-facing shoulders, a draw-bar, a coiled draw-bar spring, spring follower-plates located one at each end of said draw-bar spring and adapted for engagement at their middle parts with the draw-bar spring and for contact at their ends with the said shoulders, and movable abutment-plates located between the ends of the said follower-plates and adapted to transmit pressure from one to the other of said follower-plates.

2. A draft-rigging comprising draft-sills provided with inwardly-facing shoulders, a draw-bar, a draw-bar spring, two sets of spring follower-plates, located one at each end of the draw-bar spring, with the middle parts of the plates of each set in engagement with the draw-bar spring and the draw-bar, and movable abutment-plates located between the ends of the sets of follower-plates, the plates of each set of follower-plates being separated at their ends from each other, the outermost plate or plates of each set being adapted to bear against said shoulders and the innermost plate or plates of each set being adapted for contact with the said abutment-plates.

3. A draft-rigging comprising draft-sills provided with inwardly-facing shoulders, a draw-bar, a coiled draw-bar spring, two sets of spring follower-plates located one at each end of the said draw-bar spring with the middle parts of the plates of each set in engagement with the spring and the draw-bar and endwise-movable abutment-plates interposed between the ends of the sets of follower-plates; one or more of the plates of each set of follower-plates being curved so as to separate the ends of the plates from each other, the outermost plate or plates of each set being adapted to bear against said shoulders on the draft-sills and the ends of the innermost plate or plates of each set being adapted for contact with the said abutment-plates.

4. A draft-rigging comprising draft-sills provided with forwardly and rearwardly facing shoulders, a draw-bar, a coiled draw-bar spring, longitudinally-sliding abutment-plates on said draft-sills between the said shoulders, and a straight and a curved follower-plate located between each end of the draw-bar spring, and the draw-bar, said straight plates being adapted for engagement at their ends with the ends of said abutment-plates, and the curved plates being adapted to act against the shoulders on the draft-sills.

5. A draft-rigging comprising draft-sills provided with forwardly and rearwardly facing shoulders, a draw-bar, a coiled draw-bar spring, sliding abutment-plates mounted on said sills between said rearwardly and forwardly facing shoulders, and two sets of spring follower-plates interposed between the ends of said coiled spring and the draw-bar, 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 adapted to bear at its middle

part against the end of the coiled spring with its ends in position for contact with the ends of said sliding abutment-plates and a curved follower-plate interposed between said straight follower-plates.

6. A draft-rigging comprising draft-sills provided with forwardly and rearwardly facing shoulders, endwise-sliding abutment-plates mounted on the draft-sills between said 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 at its ends with the outer shoulders of the draft-sills, the inner flat plate of each set being adapted for contact at its ends with the ends of the said sliding abutment-plates and the curved plate of each set having its convex side in contact with the inner flat plate.

7. A draft-rigging comprising draft-sills, draft-irons attached to the sills and provided with outer forwardly and rearwardly facing shoulders, a draw-bar, a coiled draw-bar spring, longitudinally-sliding abutment-plates mounted on said draft-irons between the rearwardly and forwardly facing shoulders thereof, and spring follower-plates, the middle portions of which are adapted to engage the said draw-bar and the ends of the said draw-bar springs, and the end portions of which are adapted to engage said forwardly and rearwardly facing shoulders on the draft-irons and the ends of said sliding abutment-plates.

8. A draft-rigging comprising draft-sills provided with forwardly and rearwardly facing shoulders, a draw-bar, a coiled draw-bar spring, spring follower-plates interposed between the draw-bar and the ends of said coiled spring, longitudinally-sliding abutment-plates mounted on the sills, said abutment-plates being located between the ends of said follower-plates and being adapted to transmit pressure from one to the other of said follower-plates, and means for detachably supporting said abutment-plates in place on the sills.

9. The combination with draft-sills, of draft-irons having rearwardly and forwardly facing shoulders at their ends, a sliding abutment-plate interposed between said shoulders, and means for detachably holding the abutment-plate on the draft-irons comprising slots in the abutment-plates and lugs on the draft-irons which extend outwardly through said slots, and keys inserted through said lugs.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 15th day of May, A. D. 1901.

JAMES MILTON WAUGH.

Witnesses:
WILLIAM L. HALL,
GERTRUDE BRYCE.