No. 705,172. Patented July 22, 1902.

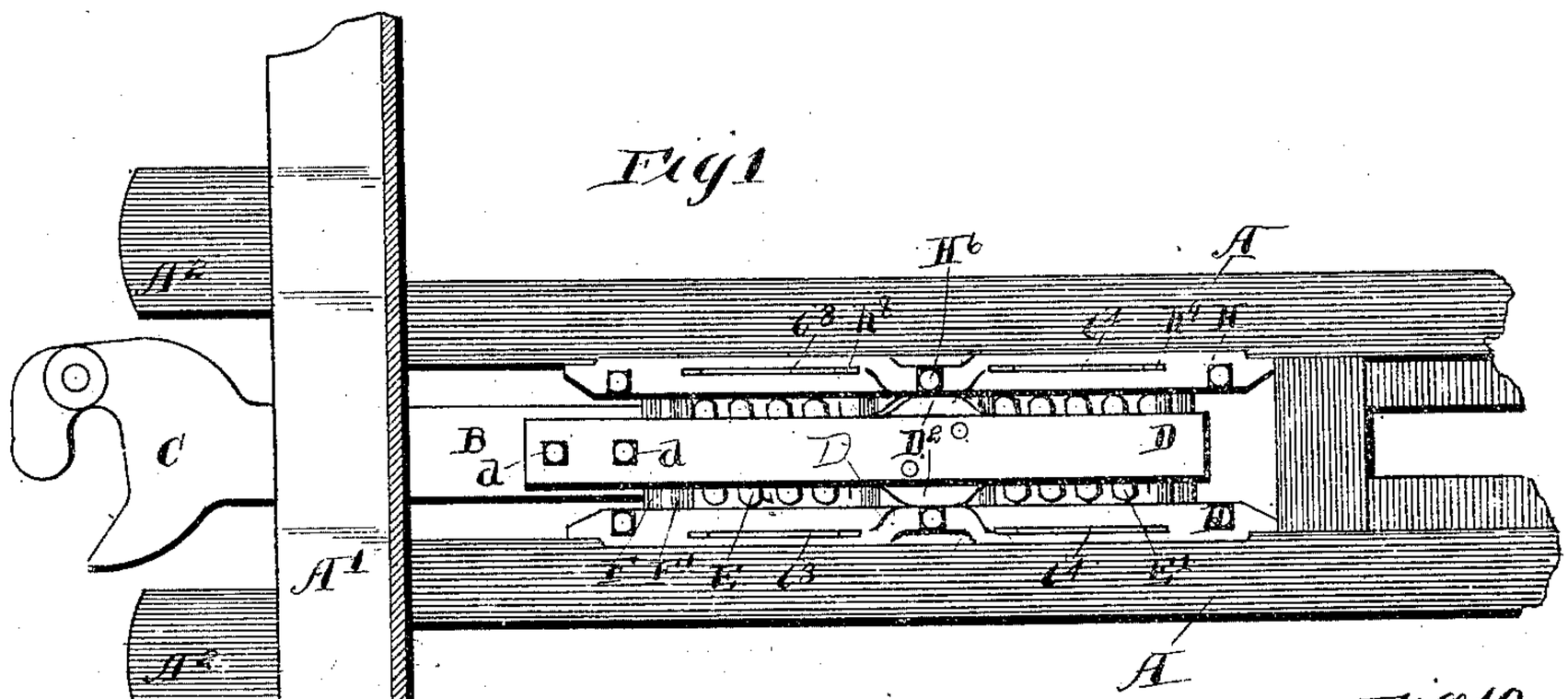
J. M. WAUGH.

DRAFT RIGGING FOR RAILWAY CARS.

(Application filed Sept. 28, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig 1



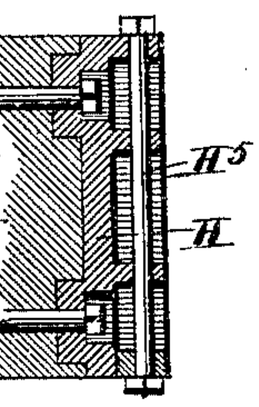


Fig 9

Fig 10

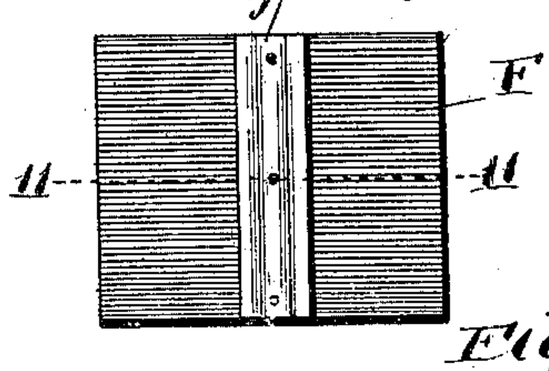


Fig 11

Fig 2

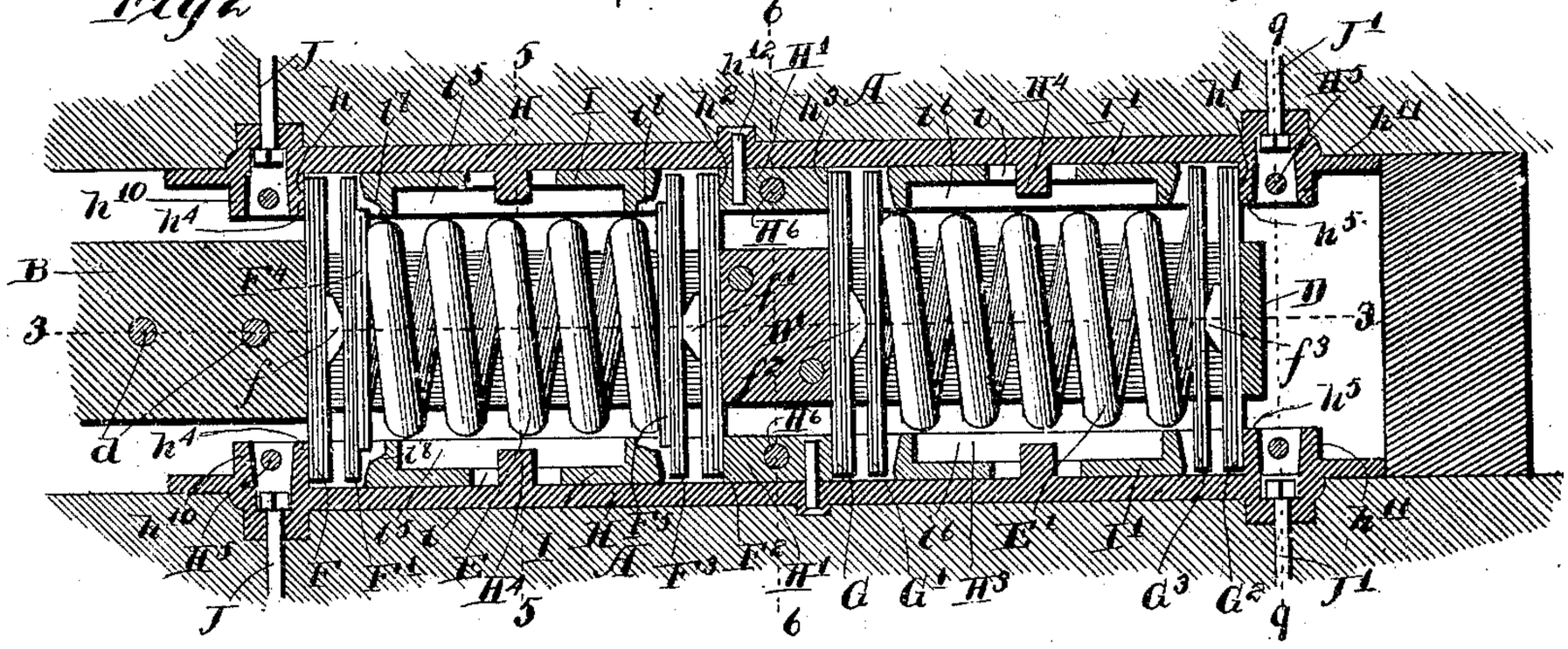
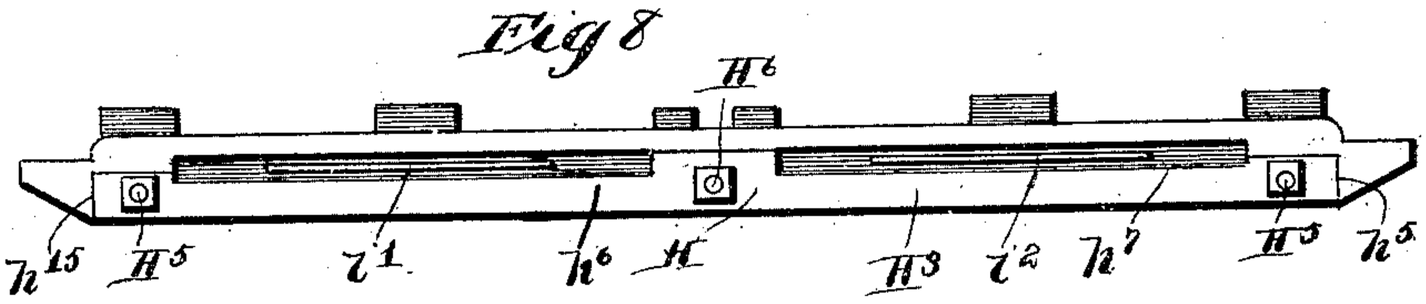


Fig 8



Witnesses:-
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No. 705,172. Patented July 22, 1902.

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DRAFT RIGGING FOR RAILWAY CARS.

(Application filed Sept. 28, 1901.)

(No Model.) 2 Sheets—Sheet 2.

Fig 3

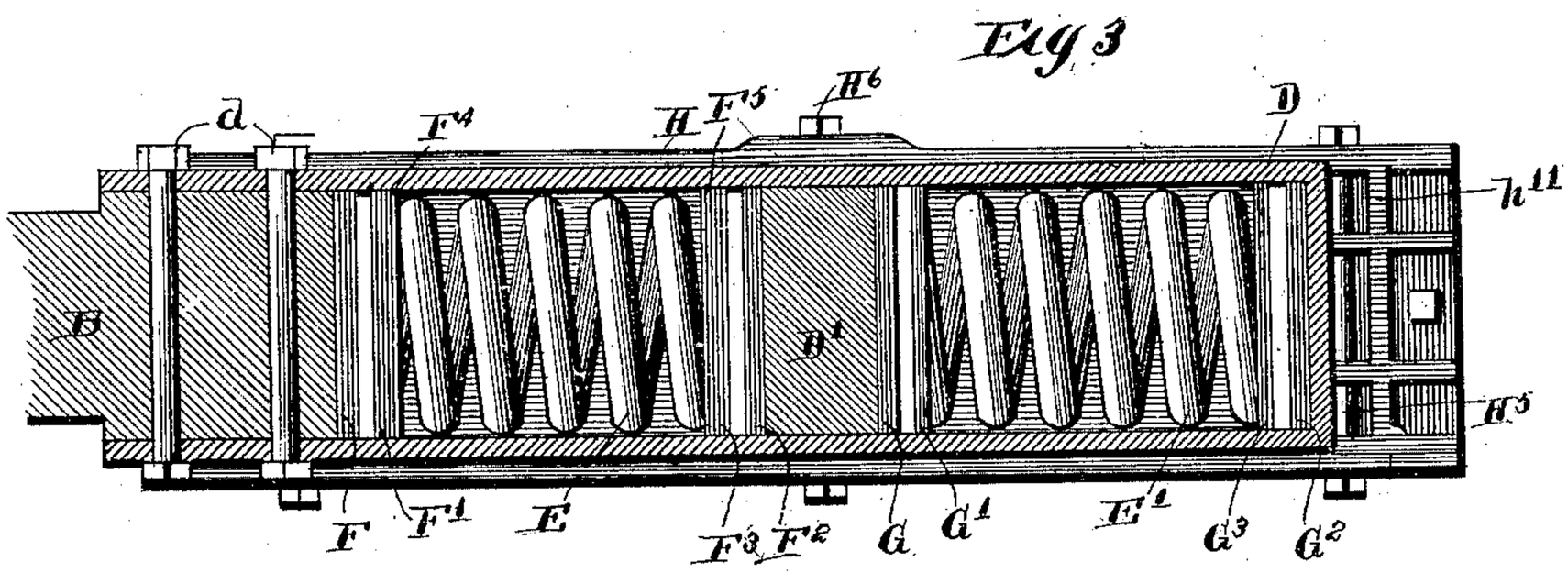


Fig 4

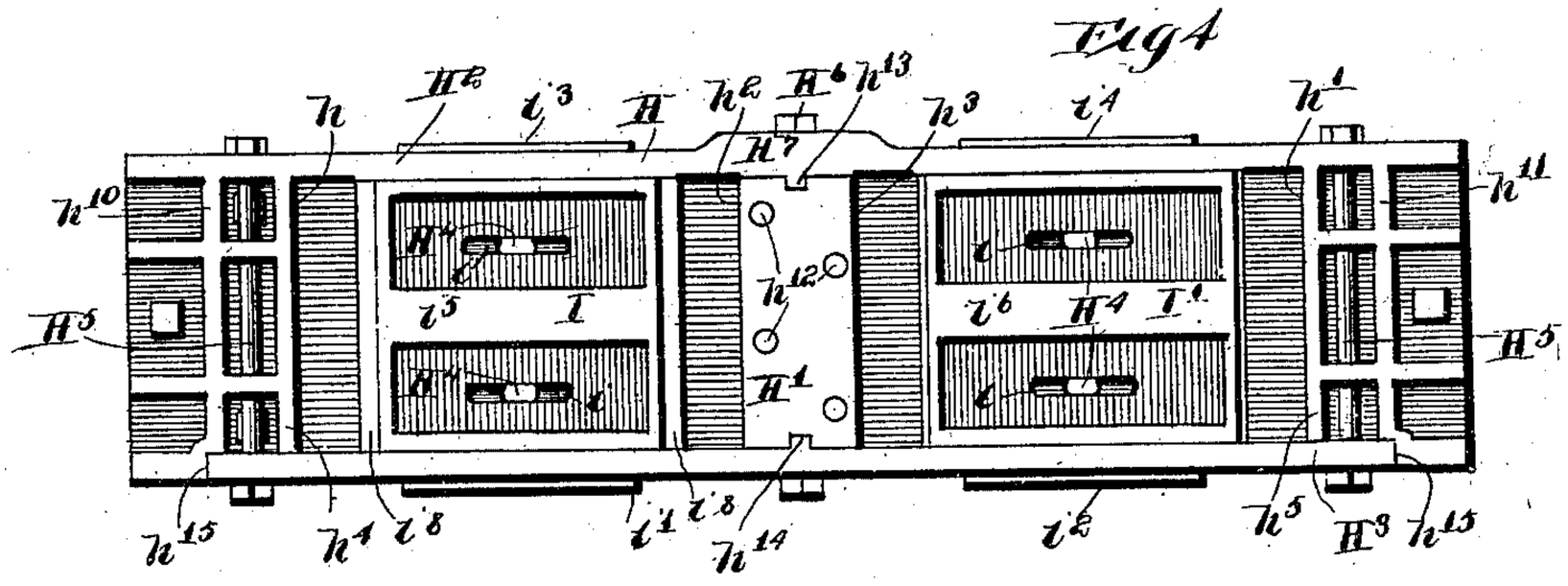


Fig 5

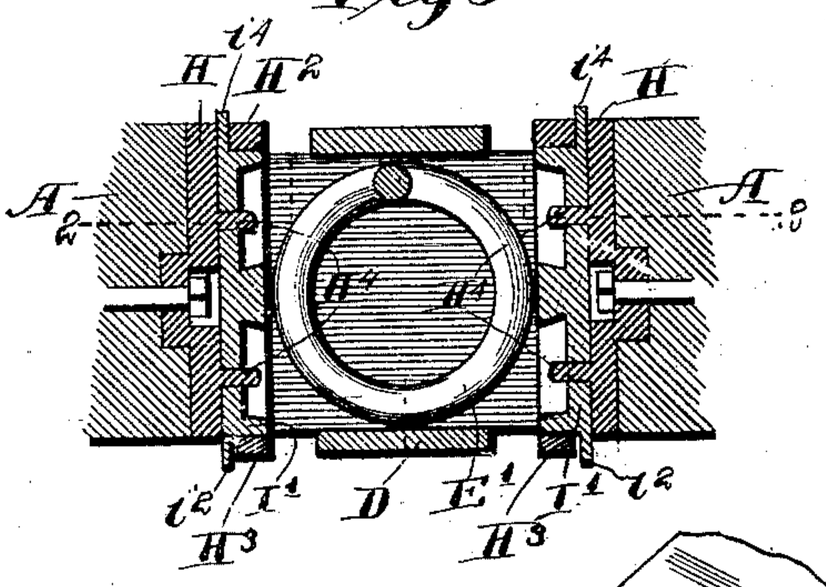


Fig 6

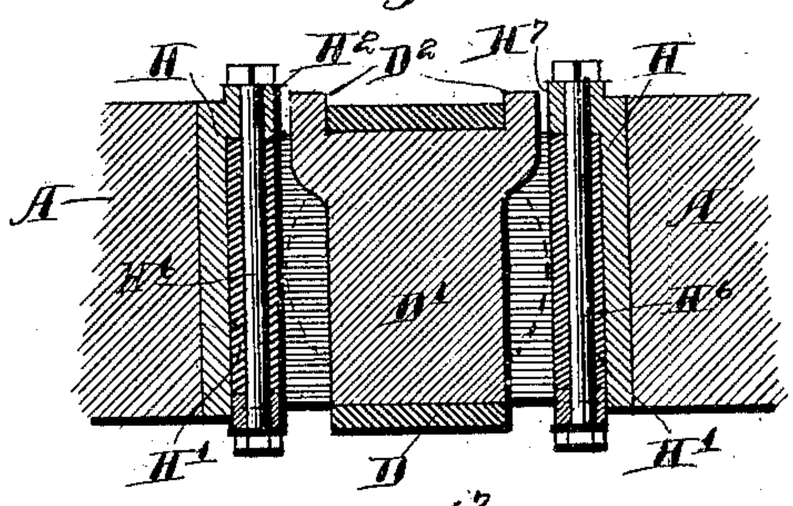


Fig 7

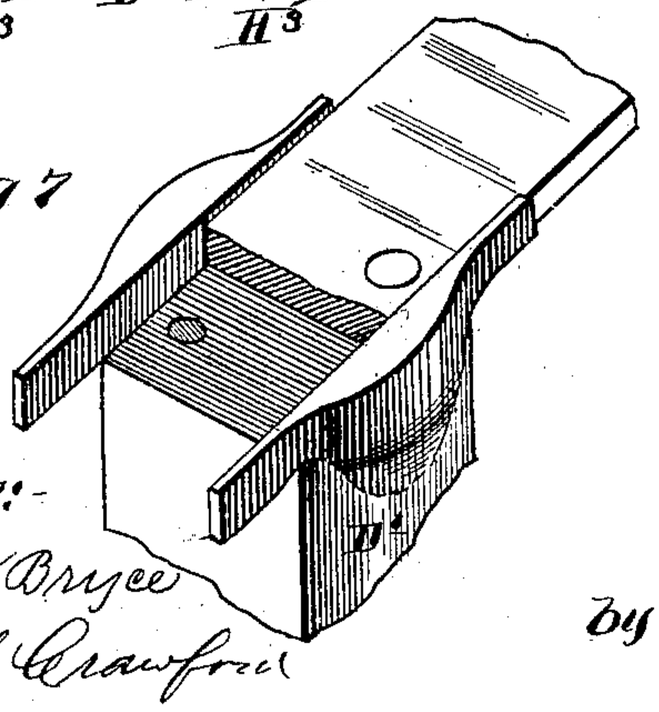
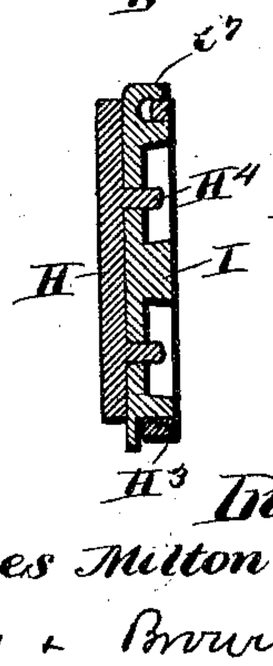


Fig 12



Witnesses:-
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by Poole & Brown
his Attorneys

UNITED STATES PATENT OFFICE.

JAMES MILTON WAUGH, OF CHICAGO, ILLINOIS.

DRAFT-RIGGING FOR RAILWAY-CARS.

SPECIFICATION forming part of Letters Patent No. 705,172, dated July 22, 1902.

Application filed September 28, 1901. Serial No. 76,833. (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 Railway-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 connection between the draw-bar and draft-sills, whereby a cushioned graduated resistance to the shocks occurring in coupling or due to variable strains in traction are obtained.

The invention herein described relates more particularly to that class of connecting devices between a draw-bar and the draft-sills of a car such as is illustrated in a prior application, Serial No. 60,685, filed by me in the United States Patent Office May 17, 1901, wherein a coiled draw-bar spring is used in connection with spring follower-plates and with movable abutment-plates adapted to transmit pressure from one to the other of the follower-plates.

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

In the accompanying drawings, which illustrate in one practical form the several features constituting my invention, 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 my invention. Fig. 2 is a longitudinal plan section of the parts shown in Fig. 1, taken on line 2 2 of Fig. 5. Fig. 3 is a longitudinal section taken on the vertical plane indicated by the line 3 3 of Fig. 2. Fig. 4 is a view in elevation of one of the draft-irons, showing the inner face thereof and abutment-plates in place thereon. Fig. 5 is a cross-section taken on line 5 5 of Fig. 2. Fig. 6 is a cross-section taken on line 6 6 of Fig. 2. Fig. 7 is a perspective view showing a part of the draw-bar yoke and of a block which is attached thereto. Fig. 8 is a view from beneath one of the draft-irons. Fig. 9 is a detail section of one end of the draft-irons, taken on line 9 9 of Fig. 2. Fig. 10 is a face view of one of the spring follower-plates. Fig. 11 is a sectional view thereof, taken on line 11 11 of Fig. 10. Fig. 12 is a sectional view through one of the draft-irons and one of the abutment-plates, illustrating a modified construction in these parts.

Referring to the said drawings, A A indicate the end portions of the draft-sills of the floor-frame of a car, the car-flooring being broken away to show the same. Said sills are attached at their outer ends to a cross-sill A′, provided with the usual dead-woods A^2.

B indicates a draw-bar which is located centrally between the draft-sills and which is provided with a draw-head C. Attached to the inner end of the draw-bar is a yoke D, which is formed of a bar of steel bent between its ends into U form and having its side parts arranged horizontally and parallel with each other and its ends adapted to overlap the top and bottom surfaces of the inner end of the draw-bar B. The ends of the yoke are shown as attached to the draw-bar by means of bolts *d*. Two coiled spiral springs E and E′ are located between the draft-sills and between the arms of the yoke, said springs being arranged end to end or tandem. The springs are held from vertical displacement by the arms of the yoke above and below the same. Between the springs is located a metal block D′, which is rigidly secured to the upper and lower parts of the yoke D by means of bolts, as shown, or otherwise.

At each end of each of the springs E E′ is located a set of transversely-arranged steel follower-plates. The follower-plates constituting the set at the outer end of the outermost spring E are indicated by the letters F F′ and are located between the end of the spring and the inner end of the draft-bar B. The follower-plates at the inner end of said spring E are indicated by F^2 F^3 and are located between said spring and the block D′. The plates constituting the set at the outer end of the innermost spring E′ are indicated by the letters G G′, and are located between said spring and the said block D′. The follower-plates at the inner end of said spring E′ are indicated by the letters G^2 G^3 and are inter-

posed between said spring and the inner end of the yoke D. The draft-sills are provided on their adjacent faces with vertical shoulders h, h', h^2, and h^3 for contact with the ends of the several sets of spring follower-plates, the shoulders h facing inwardly and being adapted for contact with the plates F, the shoulders h' facing outwardly and being adapted to engage the plates G^2, the shoulders h^2 facing outwardly and engaging the plates F^2, while the shoulders h^3 face inwardly and engage the plates G. On said sills opposite the outermost spring E' are located two horizontally-sliding abutment-plates I I, and opposite the rearmost springs are two similar sliding abutment-plates I' I'. The ends of the several follower-plates form inwardly and outwardly facing shoulders for contact with the ends of the sets of follower-plates F' F^3 G' G^3, which are in contact with the ends of the springs E E'.

The shoulders h h' h^2 h^3 referred to are formed on draft-irons H H, which are attached to the inner faces of the draft-sills, and the sliding abutment-plates are mounted to slide upon said draft-irons. The shoulders h h', nearest the ends of the draft-irons, are formed upon integral vertical ribs h^4 h^5, formed on the inner faces of said irons, while the shoulders h^2 h^3 are formed on vertical bars H', attached to the said bars at the center thereof. Said draft-irons H have the form of recessed or flanged plates, secured by mortises and bolts to the inner faces of the draft-sills A. Each of said plates H is provided with an upper horizontal flange H^2 and with a separate horizontal bottom plate H^3, said horizontal flange and bottom plate forming with the vertical ribs h^4 h^5 and bar H' two recesses in each plate, in which the ends of the several follower-plates are located and within which the movable abutment-plates I I' are inserted and adapted to slide. The bottom plates H^3 serve to support the follower-plates in position and when detached enable the said follower-plates to be readily dropped out of their places. To support and guide the abutment-plates, integral lugs H^4 are cast on the inner faces of the draft-irons and extend through horizontal slots i in the abutment-plates.

In order to hold the abutment-plates in contact with the draft-irons, I provide the following construction: Slots h^6 h^7, Fig. 8, are formed between the bottom plates H^3 and the lower margins of the draft-irons, one of said slots being located adjacent to each of the abutment-plates, and said abutment-plates are provided on their lower edges with vertical flanges i' i^2, Figs. 4 and 5, which extend downwardly through said slots and by their engagement with the bottom plates H^3 hold the lower edges of the abutment-plates in place within the recesses of the draft-irons. Similarly the horizontal top flanges H^2 of the draft-irons are provided with longitudinal slots h^8 h^9, Figs. 1 and 5, through which extend vertical flanges i^3 i^4 on said abutment-plates I I' to hold the upper edges of said plates from outward movement.

The top flanges i^3 or i^4 of the abutment-plates may be provided at their upper edges with lateral flanges i^7, as shown in Fig. 12, making the said top flanges as a whole of hooked shape, so that when engaged with the top flange of the draft-iron they will support the abutment-plates from downward movement, and thereby take the weight thereof from the bottom flange.

As herein shown, the abutment-plates I I' are recessed to give lightness, the same being provided with marginal flanges and also with wide central horizontal raised portions or ribs i^5 i^6, which serve to hold or confine the springs E E' from lateral movement, as clearly shown in Fig. 5.

The draft-irons are shown as provided with vertical flanges h^{10} h^{11} outside of and parallel with the flanges h^4 h^5, and bolts H^5 H^5 are inserted vertically through the top flange H^2 and the bottom plate H^3 to secure the ends of said bottom plate to the draft-iron, the ends of the said plate H^3 bearing upwardly against the lower ends of the said flanges h^5, h^6, h^{10}, and h^{11}, as seen in Fig. 4. The center of the bottom plate H^3 is supported by a vertical bolt H^6, which passes through the top flange H^2 and also through the vertical bar H', so as not only to sustain the bottom plate, but to also aid in holding in place the said bar H'. To insure a strong and rigid attachment of the said bar H' to the draft-iron, I provide in addition to the bolt H^6 rivets h^{12}, which are inserted horizontally through the said bar and the draft-iron. Said draft-iron is shown, Fig. 2, as provided with thickened parts or bosses, through which the rivets pass, and which serve to afford a suitably-strong connection of the rivets with the draft-iron. The ends of the said bar H' are further secured to the top flange H^2 and bottom plate H^3 by means of integral transverse lugs h^{13} h^{14} on the top flange and bottom plate, respectively, which lugs enter transverse grooves in the top and bottom ends of the said bar.

In order to hold the bottom bar more strongly and firmly in place against the tendency to endwise movement which may result from lateral pressure on the central bar H' when said bar is interlocked with or secured at its lower end to said bar H^3 in the manner described, I provide at the lower edge of the draft-iron, at the ends thereof, inwardly-facing shoulders h^{15}, Figs. 4 and 8, in contact with which the ends of the said bottom plate rest.

The draft-irons, made as described, are held against the draft-sills by means of horizontal bolts J J', of which six are shown, three at each end, as applied to each draft-iron. The bolts are shown as inserted through the draft-irons in the spaces between the vertical ribs or flanges h^4 h^{15} and h^5 h^{15}, the bolt-heads being sunk in deep recesses and the draft-iron

being provided with bosses to give the necessary thickness of metal at the points where the bolts pass through the draft-irons.

Referring now to the construction and arrangement of the spring follower-plates and the manner in which the same operate, the same will be understood from the following: The several follower-plates are straight or flat, and the plates F F′ or G² G³, constituting each set, are separated by a metal spacing-block, as indicated by *f f′ g g′*. Said spacing-blocks are shown as flat on one side and rounded on the other, the rounded side being placed in contact with the plates which are in contact with the draw-bar springs and which are bent or curved in the action of the device. Said spacing-blocks, as herein shown and preferably constructed, are secured to the surface plates of each group of plates, as clearly shown in Figs. 10 and 11, the attachment of the spacing-blocks to the plates in this manner insuring always the retention of the said spacing-blocks in proper position for operation. The drawings show each set of plates as consisting of four outer plates, as F F² G G², and three inner plates, as F′ F³ G′ G³; but a greater or less number of plates may be used in each instance, according to the thickness or stiffness of the individual plates and other circumstances. In the case of the sets of plates at the ends of the outer spring E auxiliary plates F⁴ F⁵, shorter than the others, are shown as inserted between the ends of the spring and the plates F′ F³ and in contact with the latter. The plates F⁴ F⁵ are shown as two in number. In connection with the shorter plates F⁴ F⁵ the abutment-plates I I are provided at their ends with shoulders *i*⁸, set in from the end surfaces of the plates and adapted for engagement therewith of the ends of said plates F⁴ F⁵.

The abutment-plates I′ I′ are made slightly shorter than the plates I I, or the parts are otherwise so proportioned that the ends of said plates I′ I′ stand normally at a greater distance from the ends of the plates G′ G³ than do the ends of the abutment-plates I I from the plates F′ F³.

The natural or normal position of the parts is shown in Figs. 1 and 2, the plates F F² G G² being held by the expansive action of the draw-bar springs with their ends in contact with the several shoulders on the draft-irons, the ends of the abutment-plates being at this time a short distance from the two innermost sets of follower-plates F′ F³ and G′ G³. As before stated, the ends of the abutment-plates I′ are at a greater distance from their associated follower-plates than are the ends of the abutment-plates I. The parts being in this position, when the draw-bar is forced toward the center of the car the ends of the innermost follower-plates F′ of the set at the outer end of the draw-bar spring E will come in contact with the adjacent ends of the abutment-plates I I, with the result of forcing or moving said abutment-plates endwise and bringing them into contact with the follower-plates F³ at the opposite end of said draw-bar spring. Thereafter both sets of plates F′ F³ will be bent or flexed until their ends are brought into contact with the exterior plates F and F². As the abutment-plates are thus moved the inward movement of the draw-bar will be resisted not only by the draw-bar spring E, but also by the resistance afforded by the bending of said follower-plates F′ F³. While the last-mentioned follower-plates are being bent or placed under tension the shorter auxiliary plates F⁵ will not be in action, the notches *i*⁸ being so deep that the shoulders afforded thereby will not come into contact with the ends of said plates F⁵ until the ends of the said plates F′ F³ have been brought nearly into contact with the ends of the plates F and F². If the pressure of the draw-bar due to the shock of coupling is greater than will be absorbed by the interior plates F′ F³ and the auxiliary plates F⁵, the exterior plates F F² will take a part of the pressure by reason of the contact therewith of the ends of the said innermost plates F′ F³. It follows that if the draw-bar moves so far as to bring the interior plates F′ F³ into contact with the ends of the said exterior plates the auxiliary plates F⁵ will have come into play by contact of their ends with the shoulders of the notches *i*⁵, and if the pressure be sufficient to bend both plates F³ and F⁵ until the plates F³ come in contact with the plates F² further inward movement of the draw-bar will thereafter be resisted by the combined action of all of the plates associated with the draw-bar spring E.

The follower-plates associated with the innermost draw-bar spring E′ are designed to act in conjunction with those before referred to, and for this purpose the follower-plates I′ are arranged to come into contact with the ends of the plates G′ G³ when the follower-plates I have only slightly flexed the interior plates F′ F³, while said plates G′ G³ will be brought into contact with the exterior plates G G² shortly after the plates F F² have been brought into action. It follows from the above that the several plates associated with the inner and outer draw-bar spring will act together to give a cushioned graduated resistance to the inward movement of the draw-bar. The inward movement of the draw-bar is first resisted by both of the draw-bar springs. The interior plates F′ F³ are then brought into action by the abutment-plates I of the outer spring E. The interior plates G′ G³ are then brought into action by the abutment-plates I′ of the inner draw-bar spring. The auxiliary plates F⁵ then strike the inner shoulders of the abutment-plates I and add their resistance to that of the plates already in action. The exterior plates F F³ of the outer spring F then come into play by the pressure thereon of the ends of the interior plates F′ F³, and finally the exterior plates G G³ similarly come into play through the pressure thereon of the ends of the inte-

rior plates G′ G³, after which all of the follower-plates act together to resist further inward movement of the draw-bar. In the operation of the follower-plates as described the spacing-blocks *f f′* and *g g′* perform an important function, the same serving to separate the plates between which they are placed from each other, so that the interior plates F′ F³ and G′ G³ will be flexed to a considerable extent before the exterior plates come into action, and also to transmit to the exterior plates, as F² G², toward which the draw-bar is thrust, the endwise pressure of the draw-bar springs E E′, so that the exterior plates at both ends of said springs will ultimately come into action to resist the 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 described will be reversed, the yoke in such case acting on the inner ends of the draw-bar springs E E′ and tending to force the plates F and G against the shoulders *h* and *h*³.

The exterior follower-plates F and F² G G² will preferably be made stiffer than the others, because they act to take the ultimate strain or to finally limit the movements of the draw-bar. For this purpose the said plates are shown as made of four thicknesses or layers; but, if desired or preferred, thicker plates or a single thick plate may be substituted for the said plates F F² or G G². While shorter auxiliary plates, as F⁵, are shown as used in connection with the outer draw-bar spring only, yet manifestly such auxiliary plates may be used for both of such springs.

As a further improvement in devices of the kind described I provide for holding or guiding the draw-bar in its central position between the draft-sills devices, as follows: Attached to or formed on the central block D′ of the yoke D are two guide-lugs, which rise at either side of the upper member of the yoke in position for contact with the inner edges of the top flanges H² of the draft-irons. Said top flanges are also provided with raised parts or ribs H⁷, which make the flanges thicker at their central parts and afford wide and strong bearing-faces for the said guide-lugs. The said guide-lugs are shown as cast integral with the block D′ and as fitting against the sides of the upper member of the yoke, so that they form a seat or recess for said upper member, as clearly shown in Fig. 7. The guide-lugs D² serve to hold the draw-bar yoke from lateral movement under oblique or lateral strains or blows coming on the draw-head in a manner to throw said yoke sidewise against one or the other of the draft-irons.

It is to be noted that the guide-lugs D² will be needed only in cases where the width of the yoke and of the block D′ is less than the space between the draft-irons. Said lugs therefore will be so shaped that their parts which extend outwardly from the sides of the block between the faces thereof which bear against the follower-plates will be narrower than the distance between said bearing-faces. Moreover, if the said lugs are provided with parts which extend along the side edges of the upper member of the yoke beyond the said bearing-faces said parts of the lugs will be located above the upper edges of the follower-plates, as indicated in the drawings, Fig. 7. The said lugs, therefore, when arranged as described and shown do not serve to increase the width of the bearing-faces of the block, nor do they affect or interfere with the spring action of the follower-plates.

I claim as my invention—

1. The combination with shouldered draft-sills, of a draw-bar, a draw-bar spring, spring follower-plates interposed between the ends of said draw-bar spring and the draw-bar, and spacing-blocks separating the follower-plates at each end of the spring.

2. The combination with shouldered draft-sills, of a draw-bar, a draw-bar spring, follower-plates interposed between the ends of the draw-bar spring and the draw-bar, spacing-blocks separating the follower-plates, and movable abutment-plates located between the ends of said follower-plates.

3. The combination with shouldered draft-sills, of 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 draw-bar, spacing-blocks interposed between the middle parts of the plates of each set and acting to separate the ends of the said plates, and movable abutment-plates located between the ends of the sets of follower-plates, the outermost plate or plates of each set being adapted to bear against the shoulders of the draft-sills, and the innermost plate or plates of each set being adapted for contact with said abutment-plates.

4. The combination with shouldered draft-sills, a draw-bar, two tandem draw-bar springs, spring follower-plates located between the ends of said springs and the draw-bar, and movable abutment-plates adapted to transmit pressure from one to the other of the follower-plates severally associated with each of the draw-bar springs; the abutment-plates associated with the two draw-bar springs having their ends at different distances from the ends of the follower-plates which engage the same, so that the abutment-plates will come successively into action when the springs are compressed.

5. The combination with shouldered draft-sills, a draw-bar, two tandem draw-bar springs, sets of spring follower-plates located one set at each end of each draw-bar spring, the plates of each set being separated at their ends from each other and having their middle parts in engagement with the draw-bar spring and draw-bar, and movable abutment-plates located between the ends of the sets of follower-plates belonging to each spring, the outer-

most plate or plates of each set being adapted to bear against the shoulder on the draft-sills, and the innermost plate or plates of each set being adapted for contact with the abutment-plates, and the abutment-plates associated with the two draw-bar springs having their ends at different distances from the ends of the innermost plates which engage the same, so that the said abutment-plates will come successively into action when the springs are compressed.

6. The combination with shouldered sills, of a draw-bar, a draw-bar spring, spring follower-plates located one between each end of said spring and the draw-bar, movable abutment-plates located between the ends of the said follower-plates and adapted for contact at their ends with said follower-plates, and shorter spring follower-plates interposed between each end of the said spring and the main longer follower-plates, said abutment-plates being provided with shoulders at a shorter distance apart than the main and contact surfaces of the abutment-plates, and which are adapted for contact with the ends of said shorter follower-plates.

7. A recessed draft-iron for tandem-spring draft-rigging provided with an integral longitudinal top flange, a detachable, longitudinal bottom flange and with flanges at its ends affording inwardly-facing bearing-shoulders, and a vertical bar applied to the draft-iron between the end flanges to afford outwardly-facing bearing-shoulders, said bar being provided with transverse notches in its ends and the top and bottom flanges having transverse ribs which interlock with the notches to hold the bar from lateral movements in both directions, horizontal rivets securing the bar to the draft-iron, and a vertical bolt inserted through the top and bottom flanges and endwise through the bar.

8. The combination with recessed draft-irons provided with longitudinal top and bottom flanges, a draw-bar yoke, tandem draw-bar springs, a block rigidly secured between the upper and lower yoke members at a point between the springs, and spring follower-plates interposed between the ends of the springs and said block, the faces of said block which are in contact with the spring follower-plates being narrower than the space between the longitudinal flanges of the draft-irons, and said block having integral lugs which extend laterally and outwardly therefrom so as to occupy the spaces between the side edges of one of the yoke members and the adjacent longitudinal flanges of the draft-irons, said lugs being adapted for sliding contact with said flanges.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 26th day of September, A. D. 1901.

JAMES MILTON WAUGH.

Witnesses:

C. CLARENCE POOLE,

BERTHA A. PRICE.