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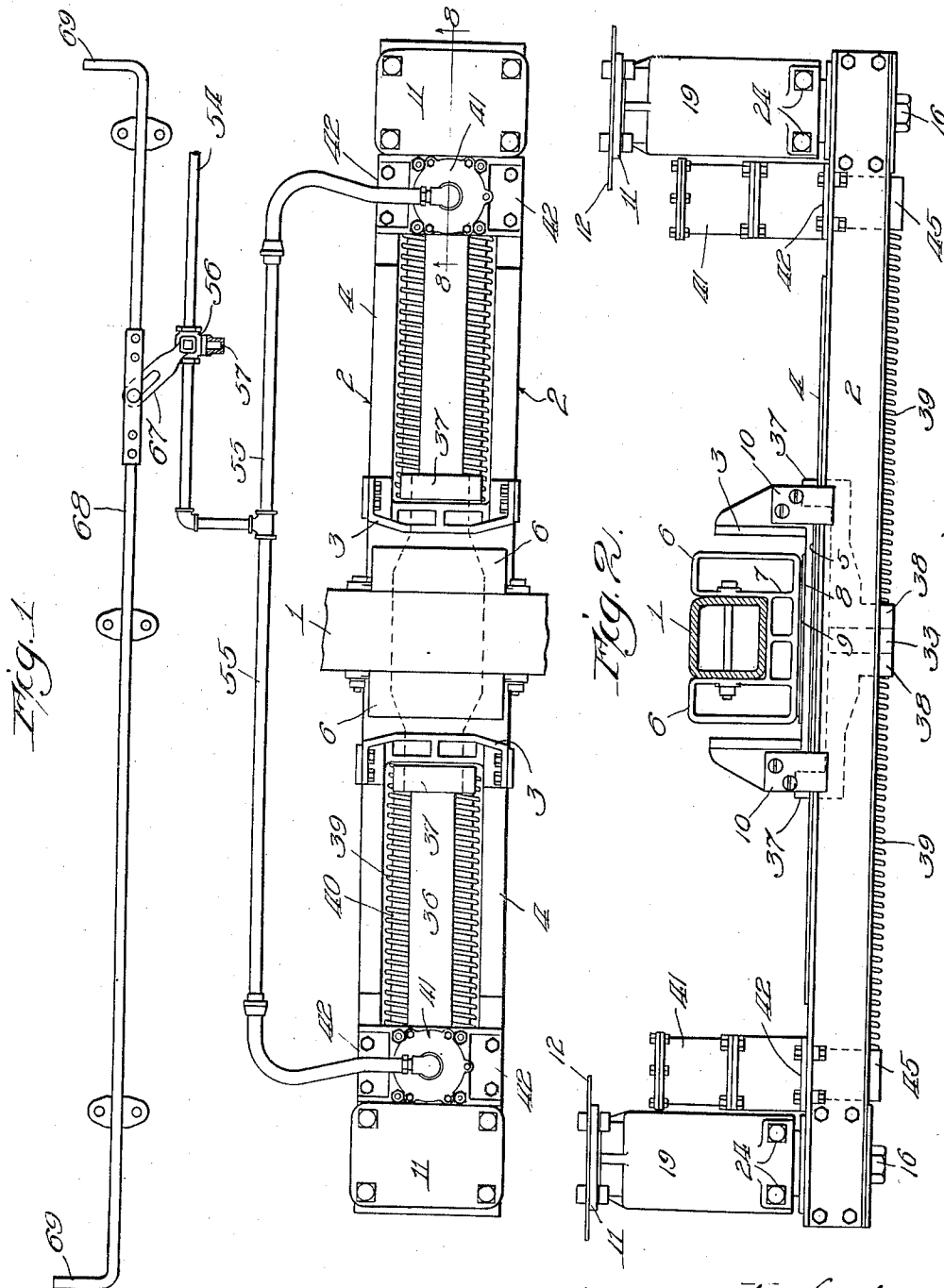
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2,226,485

DRAWBAR CARRIER

Filed April 22, 1939

5 Sheets-Sheet 1



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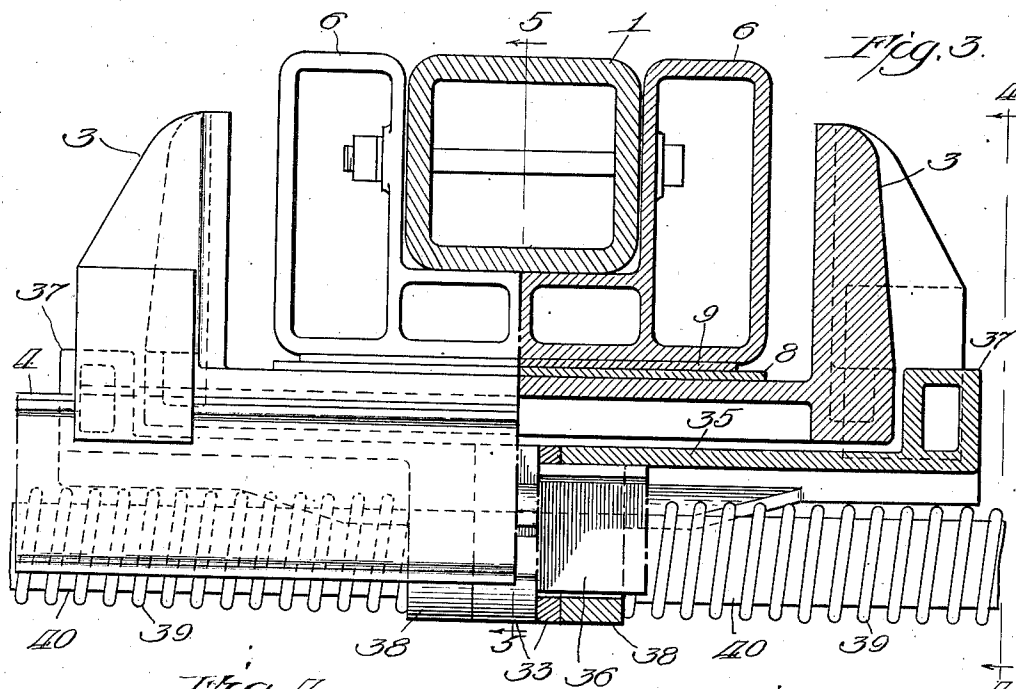
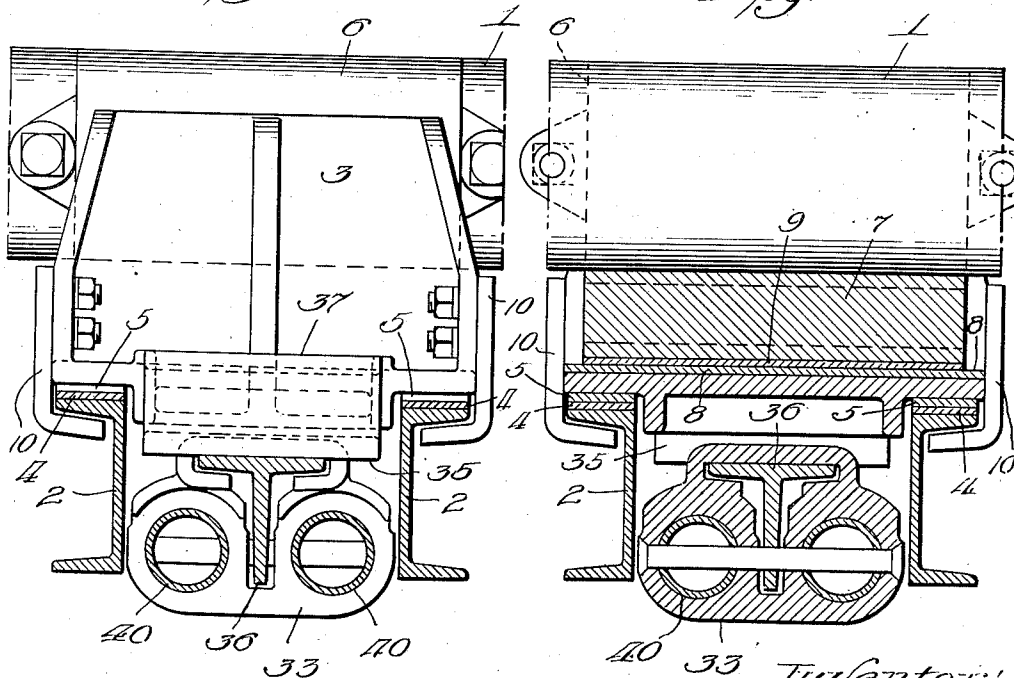
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DRAWBAR CARRIER

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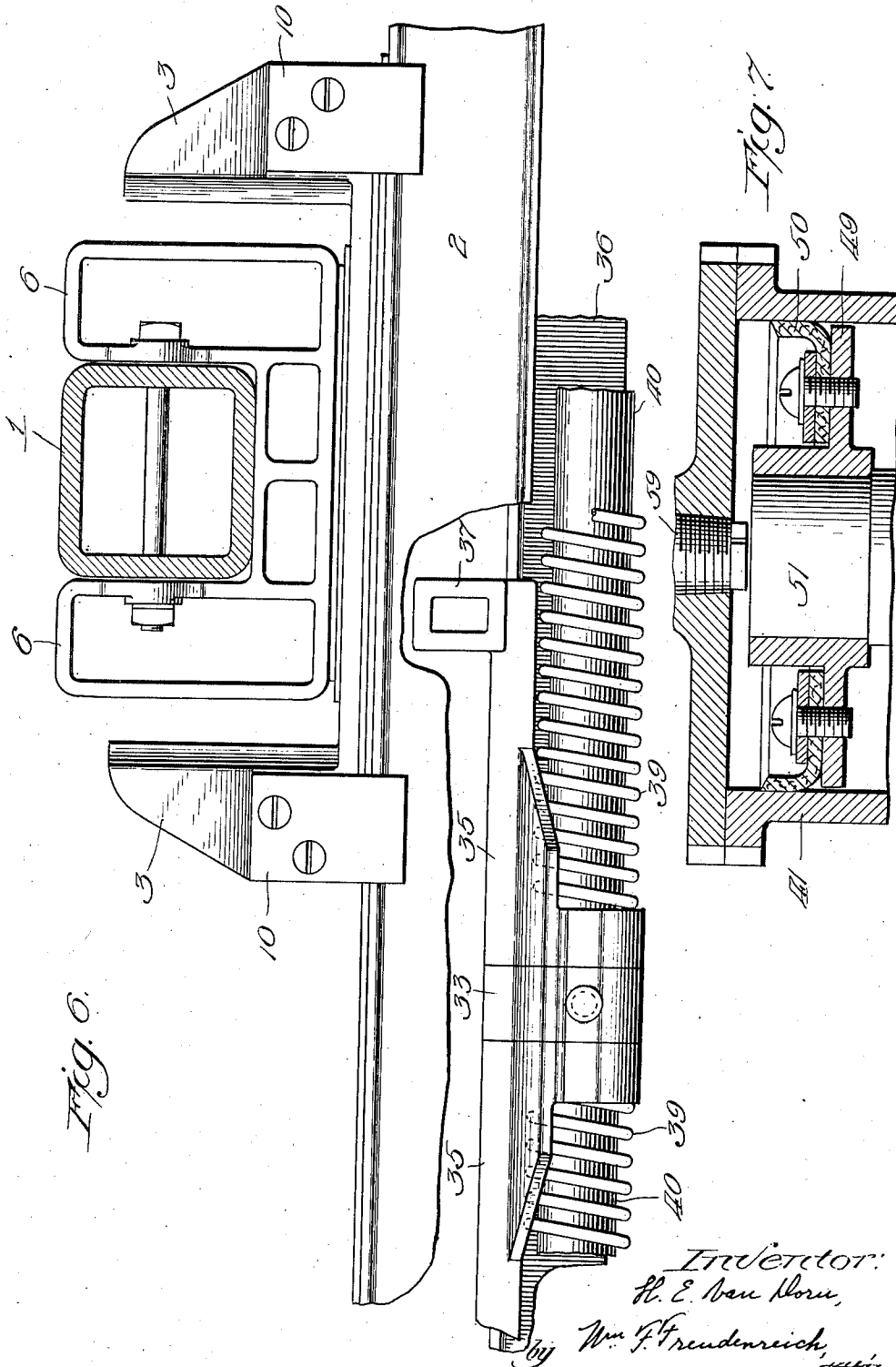
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DRAWBAR CARRIER

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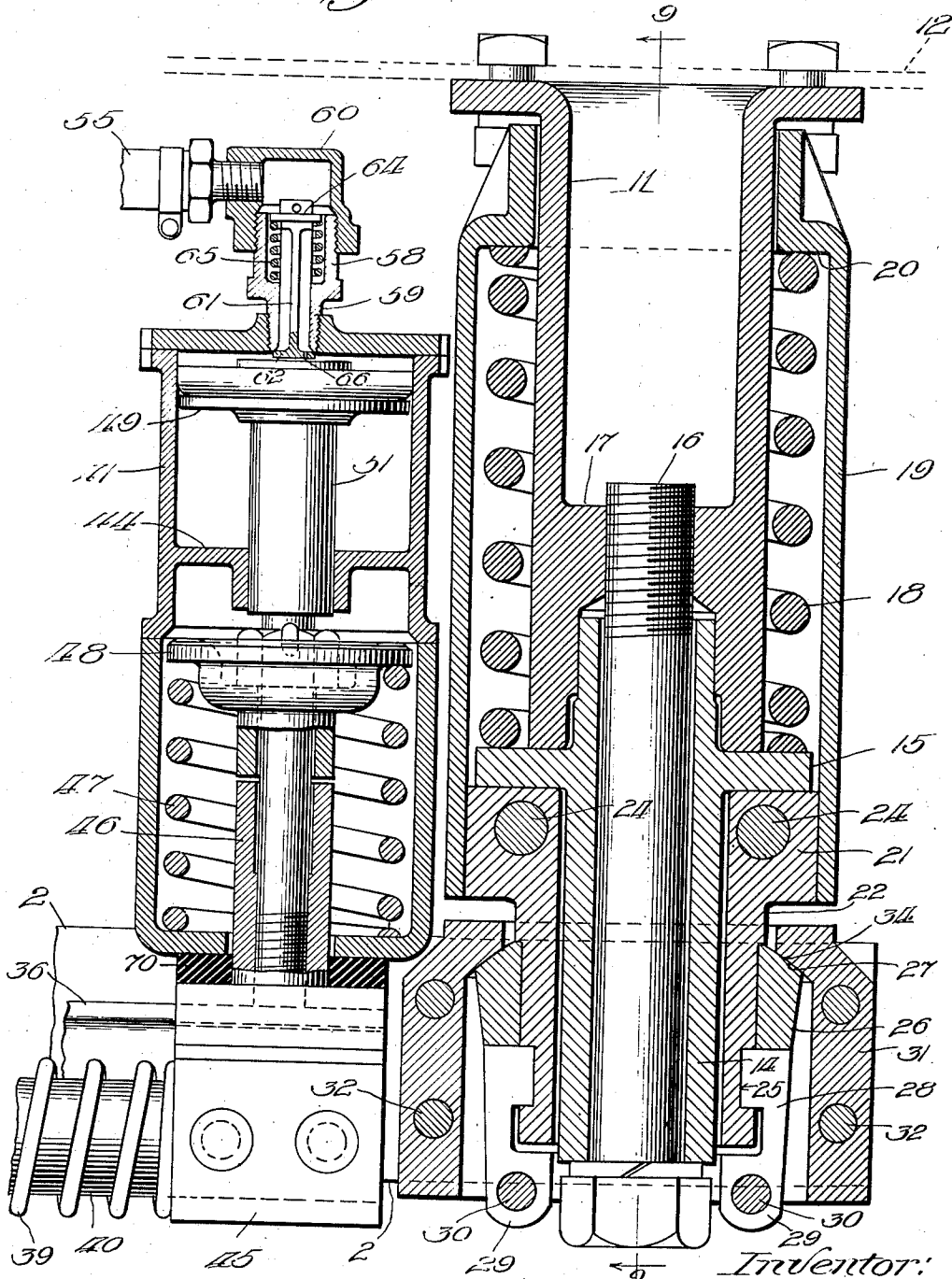
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Fig. 8.



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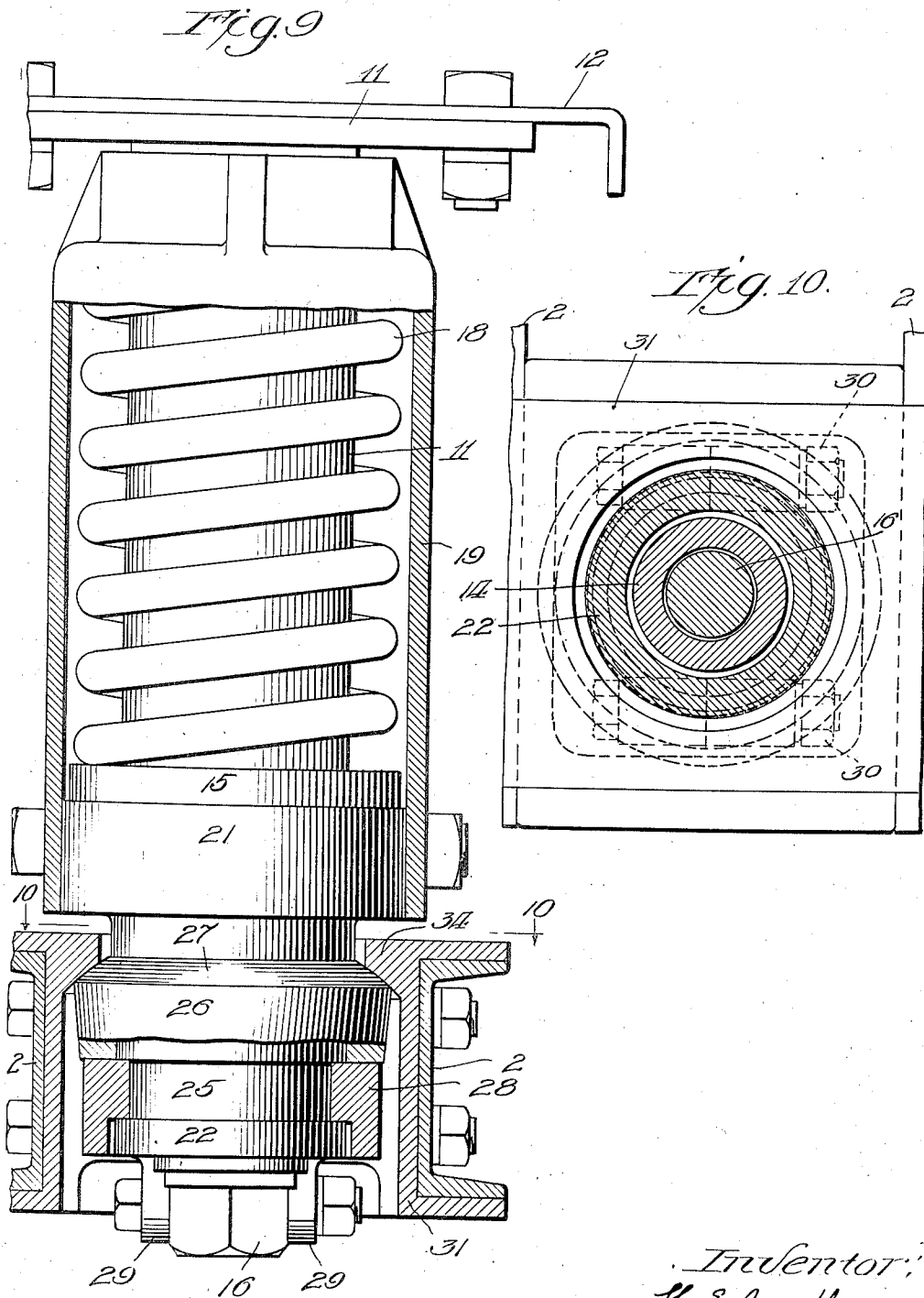
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DRAWBAR CARRIER

Filed April 22, 1939

5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,226,485

DRAWBAR CARRIER

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Application April 22, 1939, Serial No. 269,424

11 Claims. (Cl. 213—61)

Electrically-operated trains, for urban service, where sharp turns must be made, require a special type of coupling apparatus which will permit the coupler heads to swing across substantially the entire width of the cars and have capacity for substantial movements in the vertical direction. The common practice is to employ long drawbars which are pivotally connected at their rear ends to the car underframes and which are supported at their front ends by so-called drawbar carriers which slide laterally upon stationary supporting bars or beams. The present invention relates to the means for supporting the front ends of such drawbars and has for its object to produce a simple and novel form of construction.

In carrying out my invention, I employ a straight, transverse bar or bars for supporting the front ends of the drawbars, together with suitable saddles for sliding along the supporting bars; the drawbars sliding lengthwise within the saddles as the distances of the saddles from the pivotal axes of the drawbars varies during the swinging movements of the drawbars. I also provide mountings for the transverse supporting bars to permit them to move up and down when the coupler heads on the drawbars supported thereby are required to move up and down. One of the objects of the present invention is to produce a simple and novel mounting for these transverse supporting bars which will permit them to yield downwardly in the most advantageous manner regardless of the positions along the same which the drawbars may at any given times be occupying.

It is customary in this type of apparatus to provide spring means tending constantly to return the drawbars into their normal positions along the central longitudinal axes of the cars. In prior constructions the centering devices are always active and a drawbar cannot be swung laterally without meeting resistance from its centering device, unless the latter be dismantled. When two cars meet on a curve, their longitudinal center lines lie at an angle to each other and, consequently, the meeting couplers are similarly disposed with respect to each other and they must be swung laterally into alignment with each other in order to effect a coupling. One of the objects of the present invention is to produce a simple and novel centering means for a drawbar which may be thrown into and out of operation at will; so that, although it functions normally as do prior centering devices, the drawbar may at

any time be freed from the influence thereof and be moved freely from side to side.

In carrying out this latter feature of my invention, I so mount the centering device that it may be moved bodily from a working position into an idle position, the arrangement preferably being such that after a centering device has been shifted into an idle position and the drawbar has been swung laterally, the centering device will automatically return into operative relation to the drawbar without requiring further attention on the part of the trainmen.

The various features of novelty whereby my invention is characterized will hereinafter be pointed out with particularity in the claims; but, for a full understanding of my invention and of its objects and advantages, reference may be had to the following detailed description taken in connection with the accompanying drawings, wherein:

Figure 1 is a top plan view of the drawbar carrier, removed from the car, together with a fragment of the drawbar and the control system for raising and lowering the drawbar centering device; Fig. 2 is a front view of the drawbar carrier with the drawbar shown in section; Fig. 3 is a front view of the central portion of the carrier, on a larger scale than Fig. 2, partly in elevation and partly in section; Fig. 4 is a section on line 4—4 of Fig. 5; Fig. 5 is a section on line 5—5 of Fig. 4; Fig. 6 is a front view of the carrier, showing the centering device in idle position and the drawbar out of registration with the centering device; Fig. 7 is a vertical section through the upper end of one of the operating cylinders for shifting the centering device, and the piston therein; Fig. 8 is a vertical section taken on line 8—8 of Fig. 1, but on a much larger scale than Fig. 1; Fig. 9 is a view consisting partly of a section on line 9—9 of Fig. 8, with much of the structure shown in elevation; and Fig. 10 is a section on line 10—10 of Fig. 9.

Referring to the drawings, 1 represents a drawbar of any usual or suitable construction, so mounted that the front or coupler end thereof may swing across approximately the entire width of a car. In the arrangement shown, the ultimate support for the front end of the drawbar comprises two parallel channel irons 2, 2 underlying the drawbar and extending transversely of the car. The immediate supporting means for the drawbar is a U-shaped saddle 3 resting upon and spanning the distance between the two channel irons. Each channel iron has on top thereof a wearing plate 4, and the saddle has on the

under side wearing plates 5 which rest upon the plates 4. Consequently, when the saddle slides along the channel irons, the wear is all taken by the plates 4 and 5 and none by the body portions of the channel irons or saddle.

On the sides of the drawbar are fastened open-ended, rectangular sleeves 6, 6 through which cables and conduits, not shown, may be led, for the purpose of permitting the couplers to effect not only mechanical coupling of the cars but also the connection of the train lines and pipes. The members 6, 6 may conveniently form the arms of a U-shaped member 7 within which the drawbar fits, and which therefore forms an auxiliary saddle. The horizontal member of the saddle 3 is provided on its upper surface with a wearing plate 8, and there is on the under side of the member 7 a cooperating wearing plate 9. The saddle 3 is held down upon the supporting channel irons by means of L-shaped plates 10 at the four corners, one arm of each plate being fastened to the side of the saddle and the other arm extending inwardly under the upper flange of the adjacent channel iron.

The channel irons 2, 2 are supported at their ends so as to be bodily yieldable in the vertical direction and have capacity for limited rocking movements about axes extending through their ends lengthwise of the car. The details of these supports are best shown in Figs. 8 to 10. As shown in these figures, together with Figures 1 and 2, it will be seen that above each end of the pair of channel irons there is a hollow post 11 bolted at its upper end to the under side of the car, represented by the plates 12 shown in full lines in Fig. 2 and in dotted lines in Fig. 8. Extending up into the lower end of this post is a tubular extension 14 having thereon an external flange 15 which bears against the lower end of the post and projects outwardly beyond the latter. The member 14 is secured to the post by means of a sturdy bolt 16 extending up through the same and screw-threaded into a partition 17 within the post. Surrounding the post and resting at its lower end on the flange 15 is a compression spring 18.

Surrounding the post and the spring 18 is a sleeve-like casing 19 reduced in diameter at the upper end to provide an internal, annular shoulder 20 resting upon the top of the spring. Fitted into the lower end of the casing 19, below the flange 15, is a thick head 21 provided with a long tubular downward extension 22. In the arrangement shown, the head is secured in place by means of a pair of bolts, extending through the casing and through the head. The parts are so proportioned that when they are assembled, the spring 18 is under an initial compression and holds the casing 19 raised high enough to press the head against the under side of the flange 15.

The member 22 has a wide, external groove 25 extending around the same near the lower end. Surrounding the member 22 above this groove is a thick ring 26 whose upper edge 27 forms a part of a spherical surface whose center is at the axis of the stationary post. This ring is held in place by means of a two-piece casting 28 in the form of a ring adapted to fit into the groove 25. Each section of the casting has a pair of downwardly-projecting ears 29. Bolts 30 pass through and connect together each ear with the corresponding ear of the other pair and thus clamp the divided ring firmly upon the member 22.

Surrounding the stem or projection 22 and the rings thereon, is a casting 31 fitting between the corresponding ends of the two channel irons 2, 2

and bolted to the latter by means of bolts 32, of which four are shown. The upper part of this casting is directed inwardly in the form of a flange 34 overlying the spherical face 27 on the ring 26; the face of the flange that engages the face 27 being complementary thereto. The bore in the casting 31 is sufficiently large to permit a substantial rocking movement of the casting and therefore of the channel irons. It will of course be understood that the springs 18 in the supporting devices serve yieldingly to hold the corresponding drawbar in its normal, raised position, while permitting the drawbar to be forced down, when necessary, while in service. While the drawbar is in its central position, the springs at both ends will ordinarily yield to substantially the same extent, in order to permit the drawbar to be depressed. However, when the drawbar is swung closer to one side of the car than to the other, the nearer spring will yield more than the other, so that the supporting channels do not remain level but swing bodily about the ends remote from the drawbar; this swinging movement being facilitated by the presence of the ball and socket joints.

In conformity with the usual practice, I have also provided means tending constantly to hold the drawbar at the longitudinal center of the car, but permitting it to be shifted laterally as coupled cars are travelling around a curve. In the arrangement shown, the centering device comprises two flat castings 35, 35 somewhat narrower than the distance between the two channel irons 2, 2, as best shown in Figs. 3, 4 and 5; these castings being positioned on opposite sides of and abutting against a block 33 fixed to a transverse metal beam 36 lying between the channel irons 2, 2, and T-shaped in cross section. Each casting 35 has at the end remote from the block 33 an upward projection or ledge 37; the two ledges being spaced apart a distance slightly greater than the length of the body portion of the saddle 3 when both castings lie against the block 33. Each of these castings rests upon and is slidable along the beam 36 and has at the end adjacent to the block a downward extension 38 which loosely surrounds this beam and holds the casting against removal from the latter except by sliding it off one end of the same. As will hereinafter be explained, the beam or T iron 36 is supported so as normally to hold the castings 35 at such an elevation that the ledges 37, 37 project upwardly past the plane of the bottom of the saddle 3. Associated with the castings 35 are long coiled springs 39 yieldingly to hold them at the longitudinal center of the car. In the arrangement shown, there are four of these springs, a pair on each side, and each pair abutting against the depending portion 38 of the corresponding casting. The springs are shown as surrounding long, transverse tubes 40 which extend through the parts 38 and through the block 33; the castings having a sliding fit on the tubes so as to permit each of them to move lengthwise of the tubes while the latter remain stationary.

If the T iron 36 and the tubes 40 are fixed to the channel irons, the resulting structure functions in the usual way, considering it simply as a centering device. Sometimes the presence of a centering device is disadvantageous as, for example, when it is necessary to couple together two cars standing on a curve. Then, in order to effect the coupling, the drawbars must be pushed laterally against the resistance of their

centering devices until the drawbars are in axial alignment with each other. In accordance with one feature of my invention, I make the coupling of two cars on a curve simple and easy, by permitting the drawbar to be moved freely into the desired positions, without encountering any resistance from their centering devices. As a further development or improvement, I provide means for automatically restoring the normal working conditions so as to avoid leaving the drawbars uncontrolled by their centering means. To this end I so support the T iron 36 and the tubes 40 that they may be shifted vertically, as a unit, far enough to drop the ledges 37 of the centering castings below the bottom of the saddle 3 whenever it is desired to move the drawbar by hand toward one side of the car or the other. I also provide means for raising the centering unit automatically to bring it again into working relation with the drawbar saddle.

As best shown in Figs. 1, 2 and 8, there is arranged above the channel irons 2, 2, just inwardly from each end support for the latter, a vertical cylinder 41 having at the base laterally projecting flanges 42, that rest upon the tops of the channel irons and are bolted to the latter. The cylinder is divided into upper and lower sections by a transverse partition 44. Below each of the cylinders 41 is a casting or block 45 that lies between the two channel irons and is free to move up and down. The ends of the T bar 36 and of the tubes 40 are fixed to these blocks or castings which serve also as abutments for the adjacent ends of the springs 39. Each block or casting 45 has a tubular stem 46 extending upwardly from the same through the lower end of the corresponding cylinder and into the lower of the two compartments in the latter. Within this lower compartment of the cylinder and surrounding the stem 46 is a compression spring 47. A cap or follower 48 rests on top of this spring, and a sturdy bolt 49, extending down through this cap and into the stem 46, secures the cap and the stem together. In other words, the centering unit is normally held raised by means of the springs 47 at opposite ends of the same.

In the upper compartment of the cylinder 41 is a piston 49 which is slidable up and down in the cylinder but makes fluid-tight contact with the same. This may be accomplished by providing the piston with a cup washer 50, of leather or other suitable material, as shown in Fig. 7. The piston is provided with a sturdy, downwardly-projecting piston rod 51 that extends through and is guided by the partition 44 into engagement with the upper end of the piston 49.

Normally, the springs 47 hold the centering device in its raised, working position. However, if air, under sufficient pressure is admitted into the cylinders 41 above the pistons 49, the pistons are driven downwardly, compressing the springs 47 and forcing the centering device down until the drawbar is left free to move independently of the centering device. Then, when the compressed air is permitted to escape from above the pistons 49, the springs 47 become active to raise the centering device.

In order that the centering device may automatically be re-engaged with the drawbar or, rather, with the saddle 3 in which the drawbar is seated, I so construct the parts that while the castings 35 remain in their central or neutral positions, the saddle 3 cannot be shifted so far either to the right or to the left as to be carried completely beyond the corresponding ledge 37.

In other words, if the drawbar is swung to the right as far as it will go, the lefthand end of the saddle overlies the righthand ledge 37, as indicated in Fig. 6, assuming that the centering device has been lowered into its inoperative position. Consequently, after the drawbar has been released from the centering device and been shifted to one side or the other, the centering device cannot again rise to its normal working position until the drawbar has been swung back to the center of the car; because one or the other of the ledges 37 will strike against the under side of the saddle 3 whenever the pressure in the operating cylinders is released, and thus further upward movement of the centering device is arrested. It follows, however, that whenever a coupling has been made by first releasing the centering devices on the adjacent ends of two cars meeting on a curve, and the two drawbars have been swung laterally into alignment with each other, the centering devices will snap into operative relation to their drawbars as soon as the cars reach a straight portion of the track, assuming that the operating cylinders have previously been vented.

In Figure 1 there is illustrated a simple control system for the centering device, operating air being supplied through a pipe 54 which may be connected to the reservoir line, not shown. The pipe 54 has two branches 55, 55 each of which leads to the upper end of one of the cylinders. In the pipe 54 is a valve 56 so constructed that when it is open, air may flow into both of the cylinders whereas, when it is closed, the air from both cylinders may escape to atmosphere. It is not desirable that the air be released quickly from the cylinders and thus cause the centering device to be driven sharply in the upward direction. In order to slow down the action, the venting at the valve 56 may take place through a small port or orifice 57. Further retardation of the rate of reduction of the pressure in the cylinders may be effected by the valve device illustrated in Fig. 8. This valve device is arranged in the connection between the branch pipe 55 and the cylinder. This connection comprises a cup-shaped part 58 having on its lower end a nipple 59 that is screwed into the top of the cylinder. The open end of the cup is closed by a cap 60 to which the pipe 55 is in turn connected. Extending down through the member 58 and its nipple is a valve stem 61 having on the lower end thereof a valve 62 adapted to shut off communication between the source of supply and the interior of the cylinder. On the upper end of the valve stem is a head 64 which rests on top of a compression spring 65 surrounding the stem and being under an initial compression. Consequently, the spring normally holds the valve 62 closed. However, since the valve closes upwardly or outwardly, when air under pressure is admitted, the valve is forced open and the air is allowed to flow into the cylinder. When the controlling valve is closed, so as to vent the pipe 55 to atmosphere, the valve 62 serves as a check valve to close the outlet for the air within the cylinder. Because the air must escape from the cylinder within a reasonably short time, however, the valve 62 has a small port or passage 66 extending through the same, whereby the air trapped in the cylinder by the closing of the valve can escape slowly.

The controlling valve 56 may be operated in any suitable way. In the arrangement shown, 75

this valve is provided with a handle 67 connected to a suitable rod 68 which is adapted to be mounted underneath and transversely of the car and be provided at its ends with handles or hand holds 69, so that the valve may be opened and closed from either side of the car. Whenever it is necessary to disconnect the centering device from the drawbar, the rod 68 is pushed or pulled by means of one of the handles 69 until the valve is open. Then, as soon as the centering device has been depressed, the drawbar is swung laterally into the desired position, and the rod 68 is again operated so as to close the controlling valve; thereby permitting the centering device to rise until its movement is arrested through engagement of one of the ledges on the centering castings with the under side of the saddle. This condition will be maintained until the drawbar is returned to its central position, as heretofore explained; whereupon the supporting springs for the centering device will complete the upward movement of the latter and interengage the centering device and drawbar.

For the purpose of preventing the noise that would result from the striking of metal against metal at the end of the final up thrust of the centering device when the drawbar reaches its central position, I have provided cushioning means between vertically movable and stationary parts at the ends of the centering unit. In the arrangement shown, this cushioning means comprises a thick layer of soft rubber 70 lying on top of and preferably cemented to each of the blocks or castings 45 and surrounding the tubular stem 46 rising from the latter. At the end of the upward movements of these blocks or castings the rubber elements strike against the under sides of the bottom heads or walls of the cylinders 41 and are firmly held against the same by the springs 47. It will be seen that the stopping of the upward movement of the centering unit is therefore made substantially noiseless and, further, that because of the presence of the cushioning layers while the centering device is in its normal, working position, rattling of the parts during the movement of the cars is avoided.

It will, of course, be understood that although the several features of my invention cooperate to produce an exceptionally satisfactory drawbar supporting means, each feature may be utilized independently of the others where all of the advantages that may be obtained from the use of the whole invention are not desired. Therefore, I intend to cover the invention in its various aspects as well as in the form of a unitary whole. Furthermore, while I have illustrated and described with particularity only a single preferred form of my invention, I do not desire to be limited to the exact structural details thus illustrated and described; but intend to cover all forms and arrangements which come within the definitions of my invention constituting the appended claims.

I claim:

1. The combination with a car having a long, transverse supporting member for the front end of a drawbar, of a centering device tending constantly to hold said drawbar in a central position when in operative relation to the drawbar, and means to move said centering device out of operative relation to the drawbar independently of any movement of said support, at will, in order to permit the drawbar to be shifted freely along said support.

2. The combination with a car having a long,

underlying transverse support for the front end of a drawbar, of a centering device for the drawbar comprising members adapted to engage the drawbar so as to be movable in unison with the same along said support, a common carrier for said members including springs acting on said members to hold them yieldingly in a central position, and means to shift said carrier from a position in which said members are operatively related to the drawbar to a position in which the drawbar is left free to move along said support independently of said member.

3. The combination with a car having a long, transverse underlying support on which the front end of a drawbar is adapted to move from side to side, of a hanger depending from the car above each end of the support, a compression spring upon each hanger and supported at its lower end by the latter, a member having supporting elements therefor resting upon the upper end of the spring, a connection between the lower end of each of said members and the adjacent end of the support, centering means for the drawbar, including springs, and means for mounting said centering means on said support and permitting it to be shifted into and out of working relation to the drawbar independently of any movement of said support.

4. The combination with a car having a long, transverse supporting member for the front end of a drawbar, of an element mounted on said support below the drawbar so as to be movable vertically, a centering device on said element tending constantly yieldingly to hold said drawbar in a central position when in operative relation to the drawbar, and means to move said element up and down relatively to said support to shift the centering device into and out of operative relation to the drawbar, at will.

5. The combination with a car having a long, underlying transverse support for the front end of a drawbar, of a beam extending lengthwise of said support and mounted thereon for bodily movements in the vertical direction, a centering device for the drawbar comprising spring-held members slidable along the said beam and adapted to engage the opposite sides of the drawbar so that one or the other is normally movable in unison with the drawbar and when the latter moves sideways along the support, and means to move the beam up and down relatively to said transverse support to shift said members from positions in which they engage the drawbar to positions in which the drawbar is left free to move along said support independently of said members.

6. The combination with a car having a long, underlying transverse support for the front end of a drawbar, of a beam extending lengthwise of said support, springs on the support to hold the beam up, pneumatic actuating means to press the beam down; and a centering device for the drawbar comprising spring-held members slidable along the said beam and adapted to engage the opposite sides of the drawbar when the beam is up, so that one or the other member is normally movable in unison with the drawbar when the latter travels sideways along the support, while both members lie wholly below the drawbar when the beam is moved down by the pneumatic actuating means and leave the drawbar free to move along said support independently of said members.

7. The combination with a car having a long, underlying transverse support for the front end

of a drawbar, of a beam extending lengthwise of said support, springs on the support to hold the beam up, pneumatic actuating means to press the beam down; a centering device for the drawbar comprising spring-held members slidable along the said beam and adapted to engage the opposite sides of the drawbar when the beam is up, so that one or the other member is normally movable in unison with the drawbar when the latter travels sidewise along the support, while both members lie wholly below the drawbar when the beam is moved down by the pneumatic actuating means and leave the drawbar free to move along said support independently of said members; the parts being so proportioned that the drawbar overlies a portion of one or the other of said members while at each limit of its sidewise movement to prevent the centering device from rising, after being depressed, until the drawbar is returned to its central position.

8. The combination with a car having a long, underlying transverse support for the front end of a drawbar, of a beam extending lengthwise of said support, springs on the support to hold the beam up, pneumatic actuating means to press the beam down; a centering device for the drawbar comprising spring-held members slidable along the said beam and adapted to engage the opposite sides of the drawbar when the beam is up, so that one or the other member is normally movable in unison with the drawbar when the latter travels sidewise along the support, while both members lie wholly below the drawbar when the beam is moved down by the pneumatic actuating means and leave the drawbar free to move along said support independently of said members, and means to supply air under pressure to said pneumatic actuating means and means for causing a slow escape of the air when the supply is shut off.

9. The combination with a car having a long transverse support for the front end of a drawbar, of an element mounted on said support below the drawbar so as to be movable vertically relatively to the support, a centering device slidably mounted on said element and adapted to be engaged with and disengaged from the drawbar by bodily vertical movements, means on said element yieldably holding said centering device in a central position, means on said support yieldingly to hold said element raised, and a pneumatic actuator for forcing said element down to disengage the centering device from the drawbar.

10. A mounting for an end of a transverse support for the front end of a drawbar on a car, comprising a post adapted to underlie and be fixed in a vertical position to a car, said post having a socket in its lower end, a tubular extension for the post entered at its upper end in said socket, said extension having thereon a flange of larger diameter than the post engaged with the lower end of the latter, a bolt extending up through said extension and into the post to secure the two together, the bolt being removable in the downward direction, a spring surrounding the post and resting on said flange, a sleeve surrounding the spring, elements fixed to the upper end of the sleeve resting on top of the spring, a head fixed in the lower end of said sleeve and engaged with the under side of said flange, a ball member carried by said head below the lower end of said sleeve, and a part adapted to be secured to the drawbar support surrounding and cooperating with said ball member to provide a universal joint, said ball member and said part surrounding the ball member being open on the under sides to permit the insertion and removal of said bolt.

11. A mounting for an end of a transverse support for the front end of a drawbar on a car, comprising a post adapted to underlie and be fixed in a vertical position to a car, said post having a socket in its lower end, a tubular extension for the post entered at its upper end in said socket, said extension having thereon a flange of larger diameter than the post engaged with the lower end of the latter, a bolt extending up through said extension and into the post to secure the two together, a spring surrounding the post and resting on said flange, a sleeve surrounding the spring, elements fixed to the upper end of the sleeve resting on top of the spring, a head fixed in the lower end of said sleeve and engaged with the under said of said flange, said head having a long tubular hub projecting downwardly from the same, a ball member secured upon the lower end of said hub, and a socket member engaged with and supported by said ball member and adapted to be secured to the drawbar support, said ball member and said socket member being open on the lower sides to permit the insertion and removal of the bolt.

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