Sept. 2, 1958 E. H. BLATTNER 2,850,177

DRAFT STRUCTURE

Filed Oct. 22, 1954 2 Sheets-Sheet 1

FIG. 1

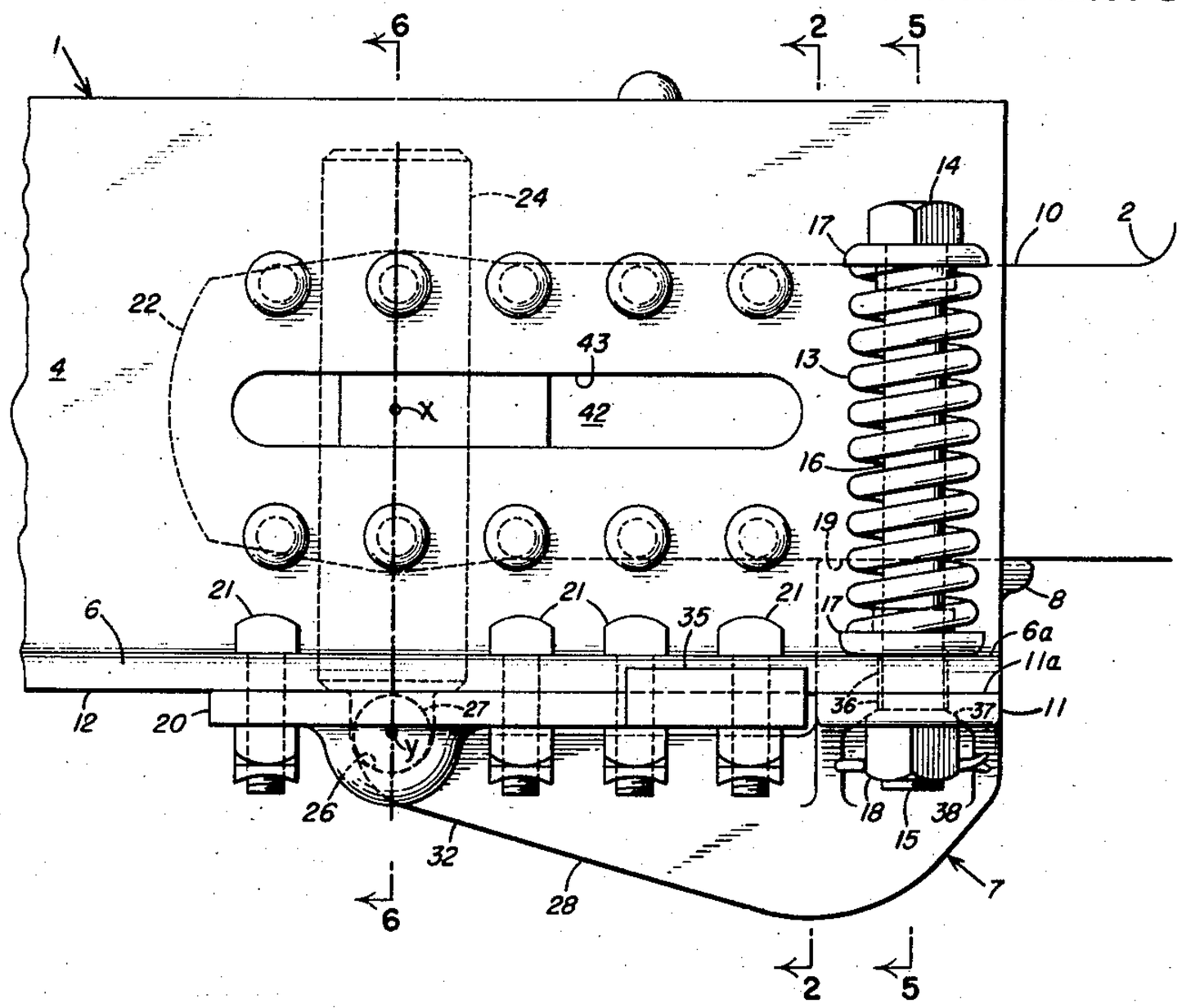
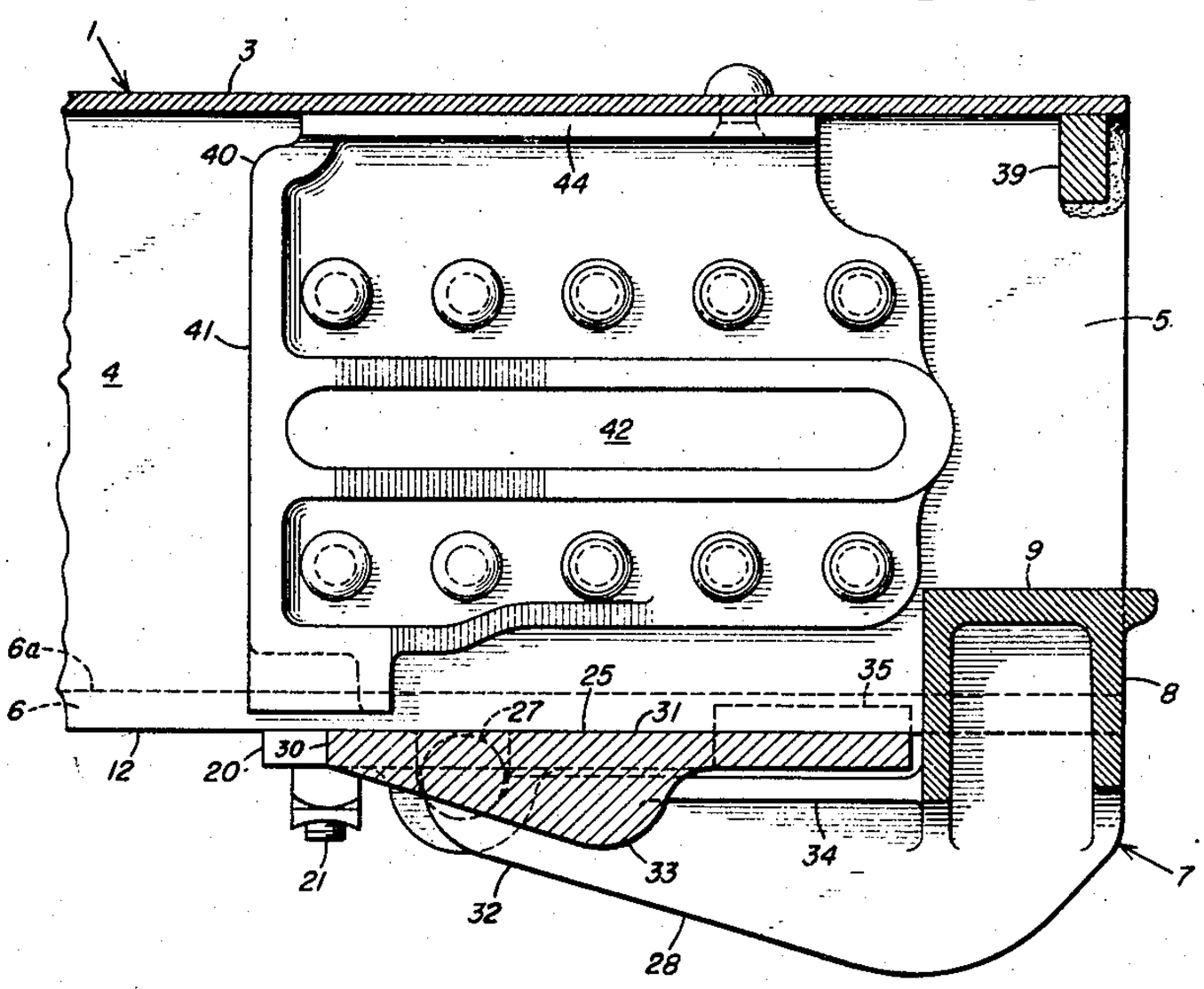


FIG. 3



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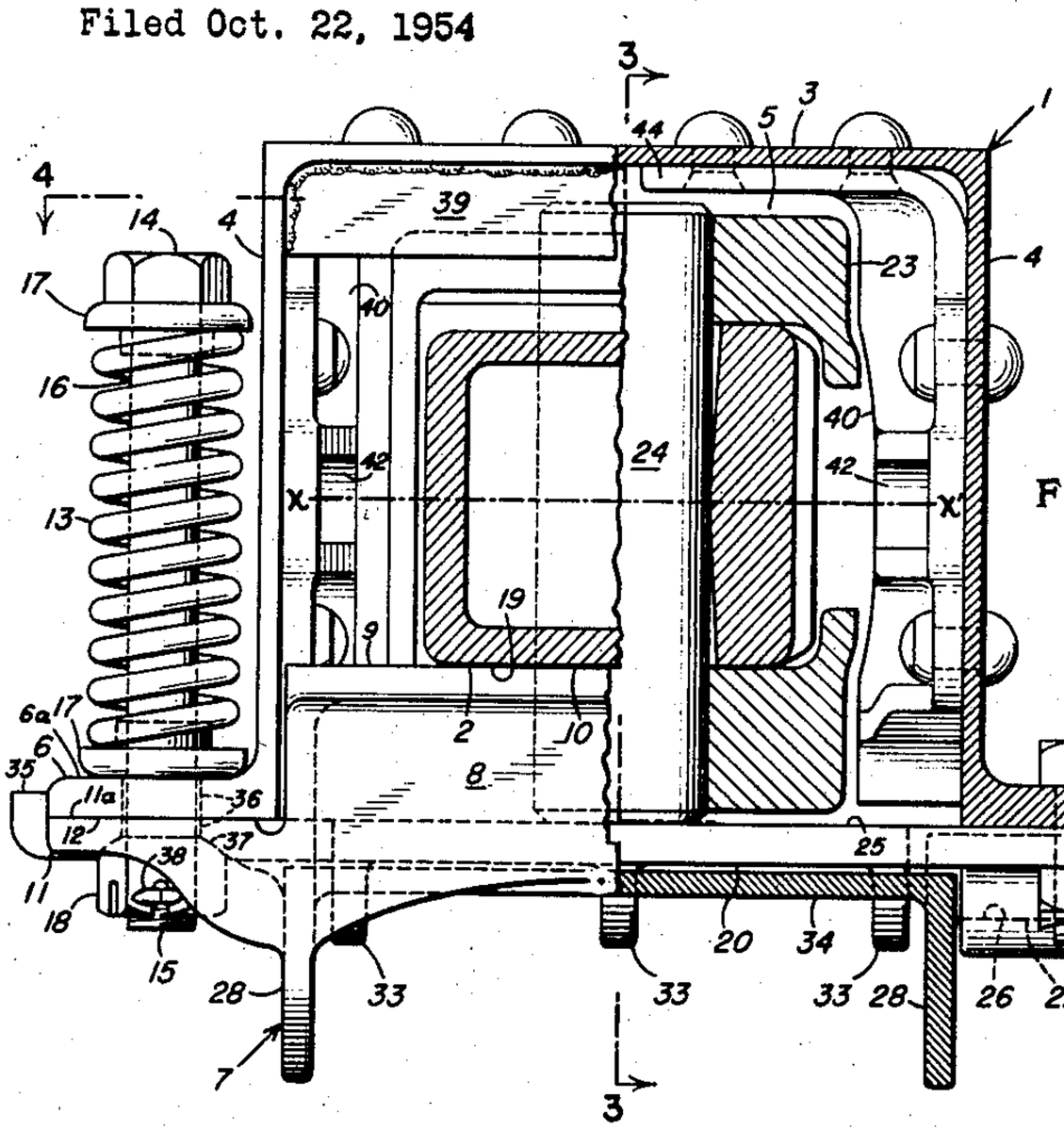


FIG. 2

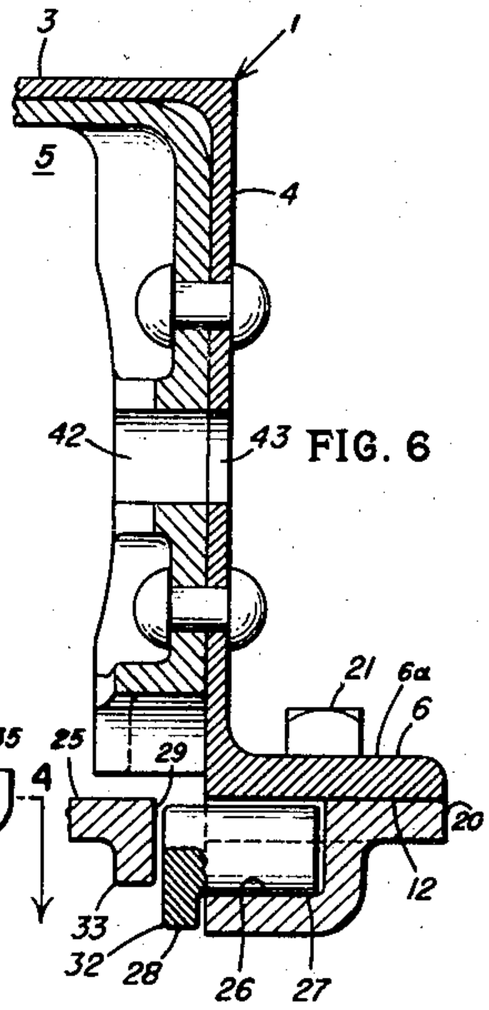
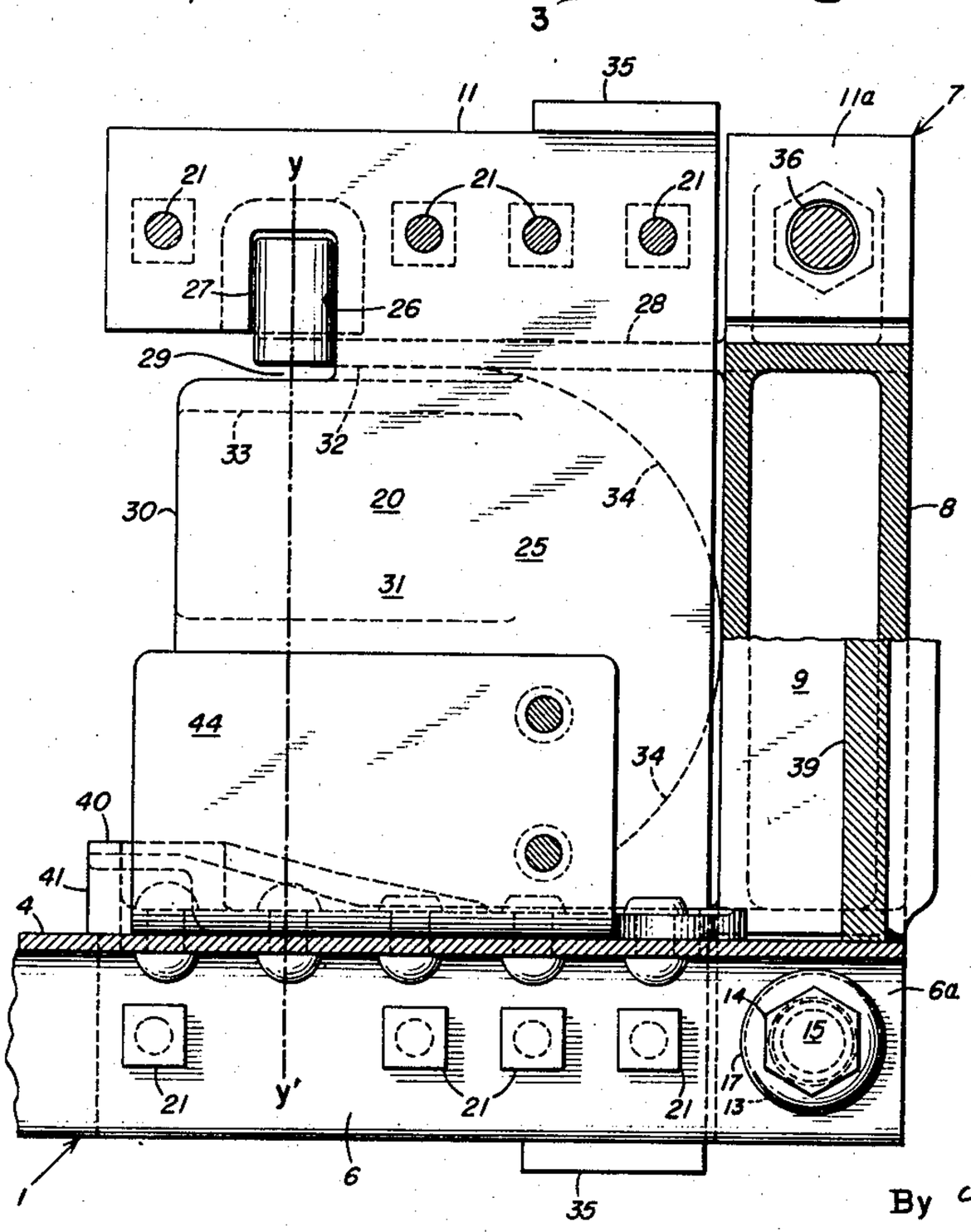


FIG. 6



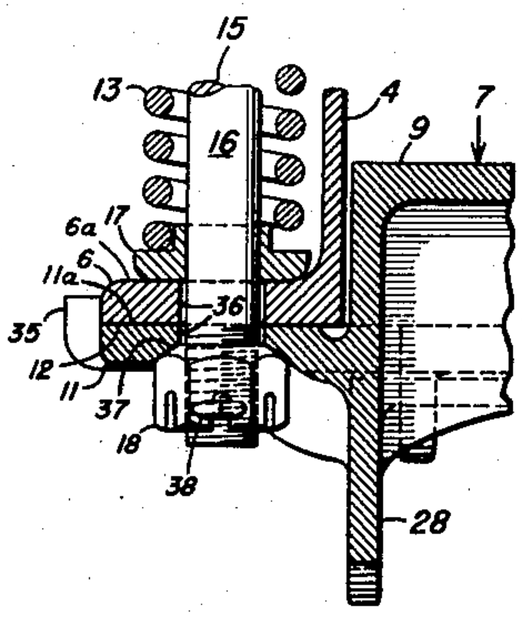


FIG. 5

FIG 4

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DRAFT STRUCTURE

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Application October 22, 1954, Serial No. 464,105

11 Claims. (Cl. 213—60)

This invention relates to draft structure for railway vehicles and has for its primary object the provision of an improved coupler carrier mountable directly on the center sills for resiliently supporting a vertically swingable coupler.

Another object of the invention is to provide a resilient coupler carrier for a vertically swingable coupler which not only yieldably resists downward swinging of the coupler, but in which the carrier iron is so mounted as to swing about a pivot substantially in vertical alignment with that of the coupler to have surface contact with the shank of the coupler during such swinging.

An additional object of the invention is to provide a multi-part draft structure for vertical swinging couplers, the component parts of which are relatively simple and inexpensive and which may readily be mounted directly on the center sills of a railway vehicle at a car shop, the structure, when mounted, effectively performing the several functions of the relatively expensive combined striking casting and coupler carrier conventionally employed with such couplers.

A further object of the invention is to provide a vertical swinging coupler carrier having a resiliently supported and pivotally mounted carrier iron for normally supporting a coupler at coupling height and maintaining substantial contact with the coupler shank during swinging thereof below coupling height under service forces.

Other objects and advantages of the invention will appear hereinafter in the detailed description, be particularly pointed out in the appended claims, and be illustrated in the accompanying drawings, in which:

Figure 1 is a side elevational view of an end portion of a center sill to which has been applied a preferred embodiment of the resilient coupler carrier and associated structure of the present invention;

Figure 2 is a front elevational view, partly in section, of the construction of Figure 1, the right-hand sectional portion being taken along the lines 2—2 of Figure 1 and the central sectional portion being taken along the lines 6—6 of Figure 1;

Figure 3 is a vertical sectional view taken along the lines 3—3 of Figure 2;

Figure 4 is a horizontal sectional view taken along the lines 4—4 of Figure 2;

Figure 5 is a fragmentary vertical sectional view taken along the lines 5—5 of Figure 1; and

Figure 6 is a fragmentary vertical sectional view taken along the lines 6—6 of Figure 1.

Referring now in detail to the drawings, in which like reference characters designate like parts, the improved draft structure of the present invention is intended to be mounted at either end of a railway vehicle (not shown) on the center sills 1 forming part of its underframe for supporting and otherwise coacting with an associated vertically or vertically and horizontally swinging coupler. For purposes of illustration, the structure has been applied to an A. A. R. alternate standard type "F" coupler, designated as 2, which is both vertically and horizontally

swingable, and has been mounted on conventional A. A. R. Z-sills. Suitably connected to the remainder of the underframe, the sills 1 of the illustrated embodiment have the usual common top horizontal web 3, which with vertical transversely spaced side walls 4, defines an opening 5 for the reception of the coupler 2 and related draft mechanism (not shown), the side walls 4 terminating at their lower extremities in the usual outturned bottom flanges 6.

The principal component of the draft structure of the present invention is a resilient coupler carrier 7, comprised of a carrier iron or member 8, preferably of inverted U-shape, which projects upwardly into and extends substantially across the opening 5 in the center sills. Underlying and having a flat, normally horizontal upper face or surface 9 in engagement with the shank 10 of the coupler 2, the carrier iron is designed normally to support the coupler at coupling height and by yieldably resisting downward swinging of the coupler under service forces, to return the coupler to coupling height when the forces are released. Unlike the carrier irons of conventional resilient coupler carriers, that of the present invention is also designed to swing about its own pivot in a circular path substantially co-radial with that of the engaged portion of the shank of the coupler, so as to maintain surface contact with the shank, except when the coupler is displaced longitudinally under buffing or draft forces, thereby minimizing wear on both the coupler and the carrier iron.

For its resilient or yieldable support the carrier iron has a pair of side or stop flanges or shelves 11 which are integral or rigid with and project from the opposite sides of the carrier iron, laterally or transversely of the center sills 1, and underlie the bottom flanges 6 of the latter. With their upper faces 11*a* spaced below the top or coupler-engaging face of the carrier iron 8 and adapted to engage the undersurfaces 12 of the bottom flanges 6 to limit the upward movement of the carrier iron, the side flanges 11, and therethrough the carrier iron 8, are suspended from and permitted to move downwardly relative to the bottom flanges 6 by resilient or yieldable means. In the illustrated embodiment these means are in the form of coil springs 13 each acting at its lower end against the upper face 6*a* of the associated bottom flange 6 and at its upper end against the head 14 of a bolt 15 whose shank 16 it encircles, the spring preferably acting at either end directly on spring caps 17 collaring the shank, to distribute its force. The shank of the bolt projects through both the bottom flange 6 and the side flange 11 and has on its end below the side flange a nut 18, the spring 13, through the interposed bolts 15 and nuts 18, applying an upward force on the side flanges 11 for normally maintaining them in engagement with the bottom flanges 6 and the top face 9 of the carrier iron 8 in its uppermost position.

Pivotal mounting of the carrier iron 8 on the center sills 1 so as to maintain the desired surface contact between its flat upper face 9 and the engaged portion 19 of the shank 10 of the coupler is here obtained through a mounting or connecting plate 20 which extends transversely or laterally between and underlies the bottom flanges 6 of the center sills 1 and is bolted or otherwise rigidly connected thereto, as by bolts 21. Spaced inwardly, longitudinally, from the carrier iron, the mounting plate 20 underlies the ball joint 22 between the coupler 2 and the yoke 23 by which the coupler is enabled to swing vertically about a horizontal axis or pivot $x—x'$, and incidentally serves as a retainer for holding the connecting pivot pin 24 in place. For performing its principal function, the pivotal mounting of the carrier iron, the connecting plate 20 has formed in its upper face 25 a pair of laterally spaced sockets or pockets 26

each of which opens inwardly of and is covered at least in part by one of the bottom flanges **6**. As shown, these pockets are of U-shape in vertical cross-section and have cylindrically surfaced lower portions whose common axis *y*—*y'* is substantially parallel to and in vertical alignment with the axis *x*—*x'* of vertical swinging of the coupler. Each of the sockets is designed to seat one of a pair of trunnions **27** rigid with and each forming part of one of a pair of transversely or laterally spaced arms **28** integral or rigid with and extending inwardly from the carrier iron **8** between the sills **1**.

With the cylindrically surfaced trunnions **27** and pockets **26** substantially coradial and the trunnions held against dislodgement from the pockets by the overlying bottom flanges **6**, the carrier iron **8**, once the trunnions are seated, will swing or pivot vertically about the horizontal axis or pivot *y*—*y'*. Due to the vertical alignment of the axes of the coupler and carrier iron, the arms **28** then have the relation to the shank **10** of the coupler of the opposite sides of a parallelogram, thus maintaining surface contact between the shank and carrier iron throughout vertical swinging of the coupler below coupling height. Since dependent upon the substantial vertical alignment of the pivots of the coupler and the carrier iron, the surface contact between these members will be replaced by line contact on vertical swinging of the coupler during longitudinal displacement of its pivot under buffing or draft forces. However, immediately on release of such forces, the surface contact will be restored, so that, except for brief intervals, the carrier iron and coupler shank will have surface contact under service conditions, with corresponding marked decrease in wear.

It will be noted that the sockets **26** are disposed intermediate the longitudinal extremities of the connecting plate **20** so that the latter can be fixed to the bottom flanges **6** on either side of the sockets. As the arms **28** are disposed beneath the connecting plate **20**, the position of the sockets **26** necessitates provision for access to the sockets to permit the trunnions **27** to be seated. In the disclosed embodiment this is accomplished by a pair of slots **29** each opening longitudinally from the inner edge **30** of the central portion **31** of the connecting plate to one of the sockets **26**. For the same purpose the arms **28** have vertically disposed flattened portions **32** which are insertible edgewise into the slots **29**. Slotted toward either side, the central portion **31** of the connecting plate may be strengthened by vertical ribs **33** and a like function may be performed for the arms **28** by horizontal webs **34** covering their juncture with the carrier iron **8**. Further, to relieve the bolts **21** securing the connecting plate to the bottom flanges **6** of transverse forces, the connecting plate may have at its sides outwardly of the bottom flanges a pair of flange-embracing upturned lips **35**.

With its arms **28** swinging under the connecting plate **20** and held thereby in a circular path as it moves downwardly and upwardly, respectively, against and under the force of the springs **13**, the coupler carrier is freed of restraint by the bolts **15** of the resilient means **13** by enlarging the holes **36** in the bottom and side flanges **6** and **11** relative to the shank **16** of the bolt, sc as to permit the latter to angle as necessary to accommodate the arcuate movement of the coupler carrier. Such angling is further facilitated by spherically surfacing the upper end **37** of the nut **18** for universal engagement with a correspondingly surfaced downwardly opening recess formed in each of the side flanges **11** about the hole **36**.

It will be noted that the force of the springs **13**, once the coupler carrier and connecting plate **20** are in place, is readily adjusted by the nuts **18** and that this adjustment is thereafter maintained by fixing the nuts against rotation as by cotter pins **38**. Should the top wall **9** of the carrier iron **8** initially or at some later

time be too high, it may be lowered by the interposition of suitable means, such as shims (not shown) between the bottom and side flanges **6** and **11**. Conversely, the height of the top wall can be raised by applying to it a shim (not shown) of the desired thickness, which may also serve as a wear plate.

Although the coupler carrier **7** is not dependent upon a striking casting for support, as are the conventional coupler carriers for vertical swinging couplers, there remains the necessity of adapting the center sills for performing the other functions normally performed for the coupler by the striking casting, one to limit the upward movement of the coupler, and another, in the case of the "F" coupler, to provide a reactance against which the coupler can pull in draft. The center sills are readily adapted for the performance of the first of these functions by welding a front stop piece or plate **39** to the top web **3** and adjacent portions of the side walls **4** so as to cover the upper portion of the opening **5** in the center sills and, with the carrier iron **8** limit the vertical movement of the coupler. Adaptation of the center sills to take draft forces is accomplished by affixing to each of the side walls **4** within the center sills a draft or front stop lug **40**, the draft lugs having necessary rear shoulders or abutments **41** for engaging the front follower (not shown) of the "F" coupler and also provided with key slots **42** aligned with corresponding slots **43** in the side walls **4** for the reception of a draft key (not shown) when the arrangement of the present invention is applied in an emergency, or otherwise, to a coupler requiring such keying to the center sills. The draft lugs **40** of the illustrated embodiment are further strengthened in their connection with the center sills through inturned top flanges **44** each integral with one of the draft lugs and both fixed, as by riveting, to the top web **3** of the center sills.

As will be evident, the particular forms of the carrier iron **8**, connecting plate **20** and draft lugs **40**, enable these parts readily to be cast without the use of cores and the entire assembly not only replaces the conventional striking casting, but eliminates the necessity of a welded subassembly at the place of manufacture, and yet imposes on a car shop no more difficulty in its application to center sills than is at present experienced in mounting a striking casting. It should be understood that the disclosed and described embodiment is merely exemplary of the invention and that all modifications are intended to be included which do not depart either from the spirit of the invention or the scope of the appended claims.

Having described my invention, I claim:

1. A resilient coupler carrier for a vertically swinging coupler comprising a carrier iron connected to an underframe of a railway vehicle for swinging vertically about a pivot vertically spaced from and in substantially vertical alignment with a pivot of said coupler, and means carried by said underframe for yieldably resisting said swinging of said carrier iron and therethrough of said coupler in one direction.

2. A resilient coupler carrier for a longitudinally movable vertically swinging coupler comprising a carrier iron underlying and engaging a shank of said coupler forwardly of the pivot thereof, yieldable means connecting said carrier iron to an underframe of a railway vehicle for normally supporting said coupler at coupling height, and means connecting said carrier iron to said underframe for vertical swinging thereof about a fixed pivot in substantially vertical alignment with a pivot of said coupler, said carrier iron through said last named means being swingable downwardly with said coupler against the resistance of said yieldable means.

3. A resilient coupler carrier for a vertically swinging coupler comprising a carrier iron underlying and engaging a shank of said coupler forwardly of a pivot thereof, yieldable means connecting said carrier iron to center

sills of a railway vehicle and acting upwardly on said carrier iron, means on said carrier iron and engageable with said sills for limiting upward movement of said carrier iron and vertically from a pivot of said coupler and with said yieldable means normally maintaining said coupler at coupling height, and means pivotally connecting said carrier iron to said sills for vertical swinging thereof about a pivot spaced inwardly longitudinally of said sills from said carrier iron.

4. A resilient coupler carrier for a vertically swinging coupler comprising a carrier iron underlying and having a substantially flat face engaging a shank of said coupler, means movable with said carrier iron and engageable with abutment means on said sills for limiting upward movement of said carrier iron, means connected to said sills and having socket means disposed transversely of said sills and in substantially vertical alignment with a pivot of said coupler, trunnion means connected to said carrier iron and seatable in said socket means for pivotally connecting said carrier iron for vertical swinging relative to said sills, and resilient means normally urging said carrier iron upwardly and yieldably resisting downward swinging thereof.

5. A resilient coupler carrier for a vertically swinging coupler comprising a carrier iron disposed between center sills of a railway vehicle beneath a shank of said coupler, shelf means underlying bottom flanges on said sills and movable with said carrier iron for limiting upward movement thereof, a plate underlying and connected to said flanges inwardly of said shelf means, spaced cylindrically-surfaced sockets in said plate and directed transversely of said sills, trunnions rotatably seated in said sockets and connected beneath said plate to said carrier iron for enabling said carrier iron to swing vertically relative to said sills, and resilient means for urging said carrier iron upwardly and yieldably resisting downward swinging thereof.

6. A resilient coupler carrier for a vertically swinging coupler comprising a carrier iron disposed between center sills of a railway vehicle beneath a shank of said coupler, shelf means underlying bottom flanges on said sills and movable with said carrier iron for limiting upward movement thereof, a plate underlying and connected to said flanges inwardly of said shelf means, aligned transversely spaced sockets in said plate opening inwardly and each underlying one of said flanges, trunnions rotatably seated in said sockets and connected beneath said plate to said carrier iron for enabling said carrier iron to swing vertically relative to said sills, and resilient means for urging said carrier iron upwardly and yieldably resisting downward swinging thereof.

7. A resilient coupler carrier for a longitudinally movable vertically swinging coupler comprising a carrier iron, a flat upper face on said iron underlying and in surface contact with a shank of said coupler, means connecting said carrier iron to an underframe of a railway vehicle for vertical swinging of said carrier iron about a fixed pivot in substantially vertical alignment with a pivot of said coupler, means yieldably suspending said carrier iron from said underframe and resisting downward swinging thereof about said pivot, and means for limiting upward swinging of said carrier iron under force of said suspending means and thereby normally maintaining said coupler at coupling height.

8. The combination with center sills having an opening and a vertically swinging coupler in said opening, of draft structure comprising a carrier iron resiliently suspended from said sills and projecting into said opening beneath and engaging a shank of said coupler for normally maintaining said coupler at coupling height, means

pivotally connecting said carrier iron to said sills for vertical swinging thereof about a pivot in substantially vertical alignment with a pivot of said coupler, a striking plate interrupting said opening above said carrier iron and shank and welded to said sills, said striking plate and carrier iron together limiting the extent of vertical swinging of said coupler, and draft lugs fixed in said sills inwardly of said striking plate for limiting outward movement of said coupler relative thereto.

9. A resilient coupler carrier for a vertically swinging coupler comprising a carrier iron projecting between center sills of a railway vehicle and underlying and having a flat face in surface engagement with a shank of said coupler, transversely spaced arms rigid with and extending inwardly longitudinally of said sills from said carrier iron, transversely spaced aligned trunnions on said arms adjacent inner extremities thereof, vertically disposed flattened portions on said arms intermediate said carrier iron and trunnions, a connecting plate underlying and connected to transversely spaced bottom flanges of said sills, sockets in said plate intermediate longitudinal extremities thereof, said sockets being spaced transversely in correspondence with the spacing of said trunnions and each underlying and opening inwardly of one of said bottom flanges, slots in said plate each extending from a rear edge thereof to one of said sockets for receiving said flattened portions of said arms and enabling said trunnions to be seated in said sockets with said arms disposed beneath said plate, said carrier iron on seating of said trunnions being vertically swingable thereabout relative to said sills, resilient means connecting said carrier iron to said sill flanges outwardly of said plate for yieldably resisting downward swinging of said carrier iron, and means for limiting upward swinging of said carrier iron relative to said sills and with said resilient means normally maintaining said coupler at coupling height.

10. A resilient coupler carrier for a vertically swinging coupler comprising a carrier iron underlying and engaging a shank of said coupler forwardly of a pivot thereof, a plate means extending between and fixed to bottom flanges of center sills of a railway vehicle beneath said pivot, means pivotally connecting said carrier iron to said plate means for swinging vertically about a pivot vertically spaced from and in substantially vertical alignment with a pivot of said coupler, and yieldable means acting upwardly on said carrier iron and reacting against said center sills for yieldably resisting downward swinging of said carrier iron under force of said coupler.

11. A resilient coupler carrier for a vertically swinging coupler comprising a carrier iron underlying and engaging a shank of said coupler forwardly of a pivot thereof, plate means extending between and fixed to bottom flanges of center sills of a railway vehicle beneath said pivot, means pivotally connecting said carrier iron to said plate means for swinging vertically about a pivot vertically spaced from and in substantially vertical alignment with a pivot of said coupler, yieldable means acting upwardly on said carrier iron and reacting against said center sills for yieldably resisting downward swinging of said carrier iron under force of said coupler, and means on said carrier iron and engageable with means carried by said center sills for limiting upward movement of said carrier iron.

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