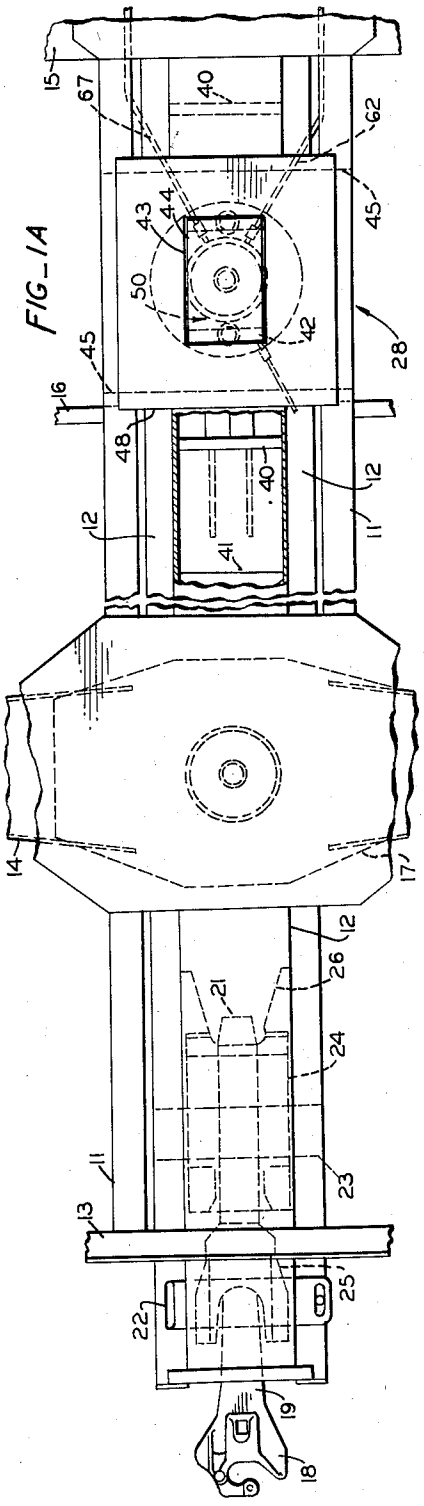
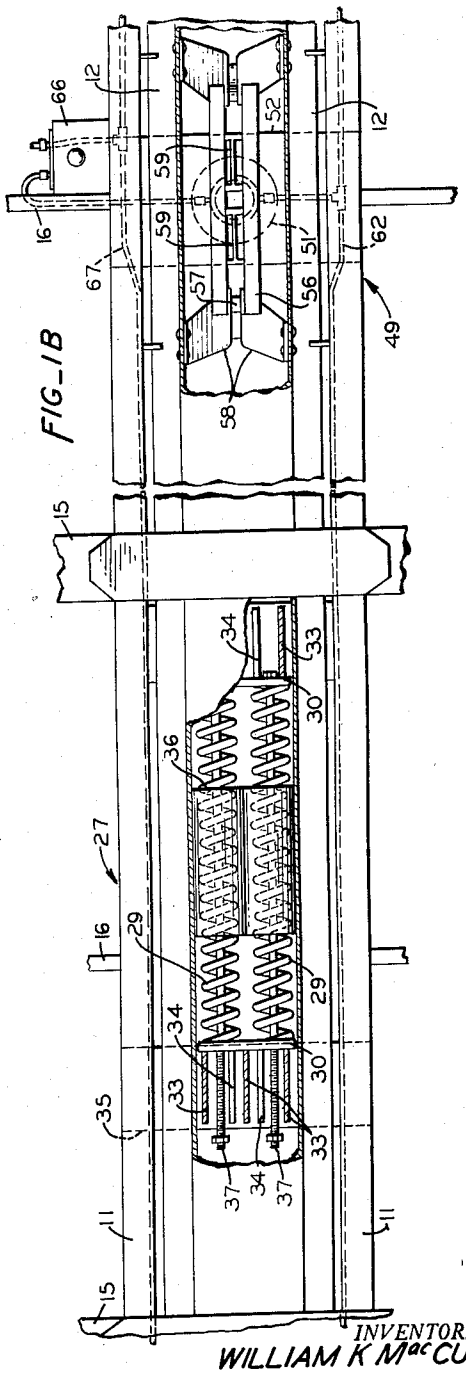
Nov. 3, 1959 W. K. MacCURDY 2,911,112

DRAFT GEAR FOR RAILROAD CARS

Filed Nov. 5, 1954 5 Sheets-Sheet 1





INVENTOR.
WILLIAM K MacCURDY

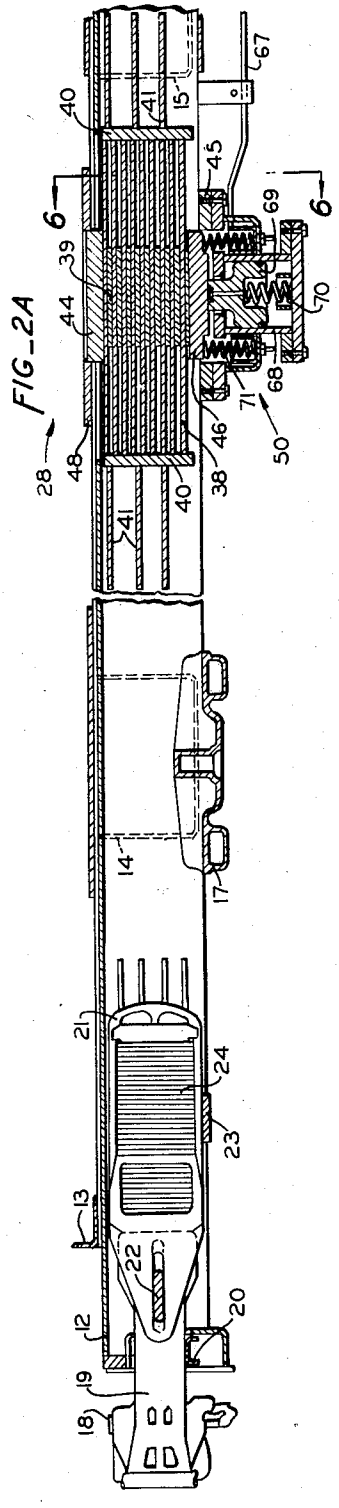
BY Mellin and Hanscom

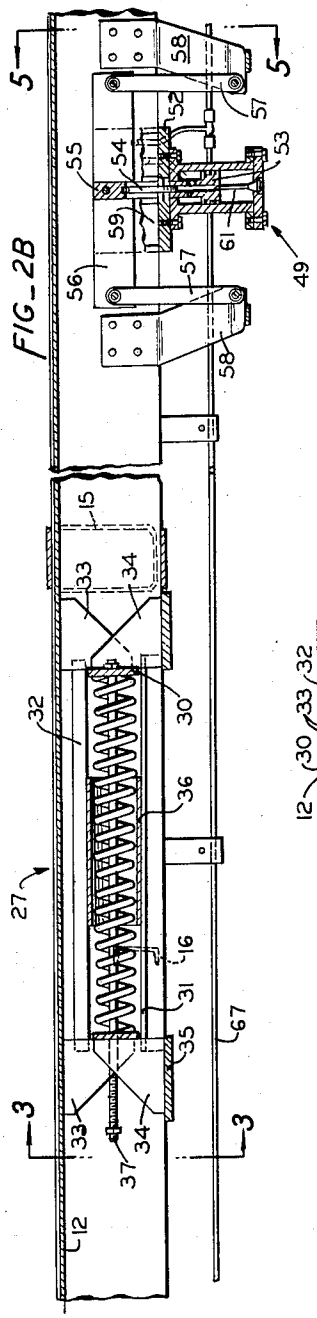
ATTORNEYS

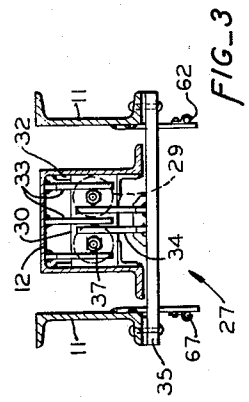
Nov. 3, 1959 W. K. MacCURDY 2,911,112

DRAFT GEAR FOR RAILROAD CARS

Filed Nov. 5, 1954 5 Sheets-Sheet 2







INVENTOR.
WILLIAM K MacCURDY
BY Mellin and Hanscom
ATTORNEYS

Nov. 3, 1959 W. K. MacCURDY 2,911,112

DRAFT GEAR FOR RAILROAD CARS

Filed Nov. 5, 1954 5 Sheets-Sheet 3

FIG_4

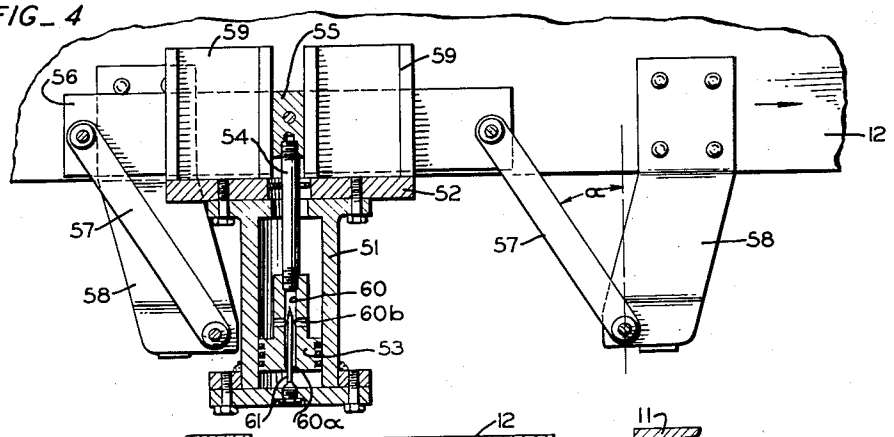


FIG_5

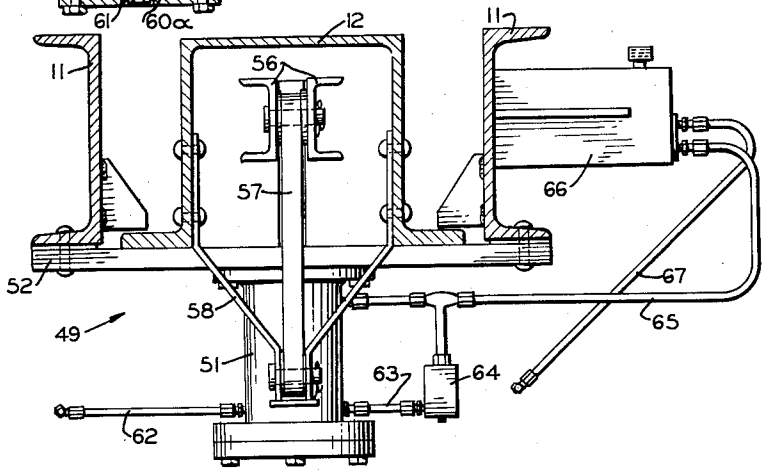
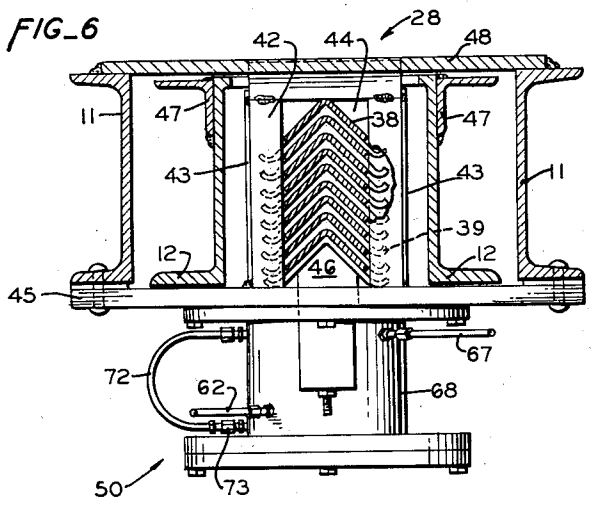


FIG_6



INVENTOR.
WILLIAM K MacCURDY
BY Mellin Quarles & Hanscom
ATTORNEYS

Nov. 3, 1959 W. K. MacCURDY 2,911,112

DRAFT GEAR FOR RAILROAD CARS

Filed Nov. 5, 1954 5 Sheets-Sheet 4

FIG_7

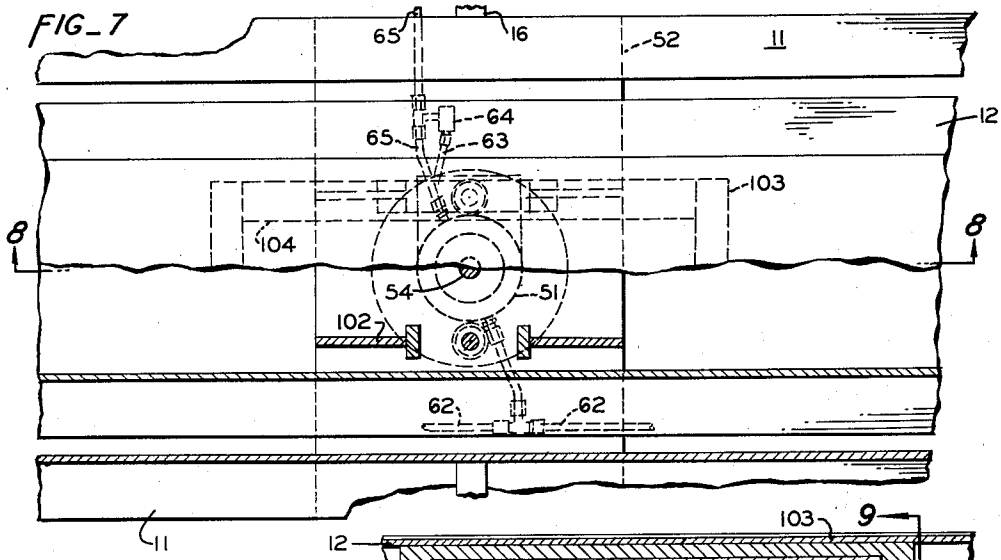


FIG_8

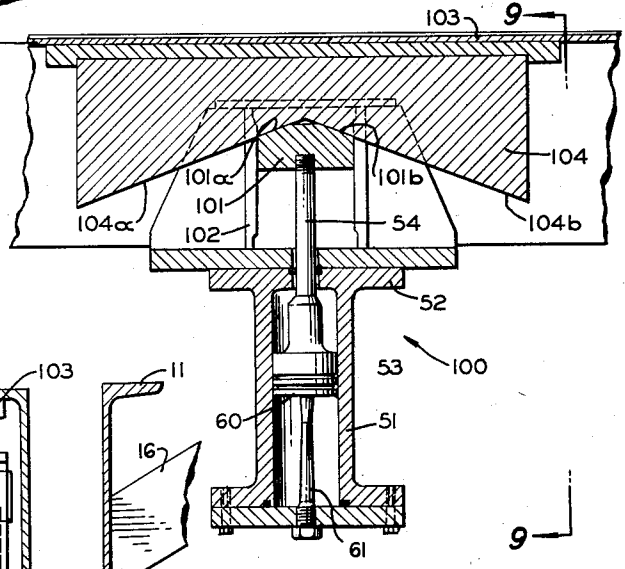
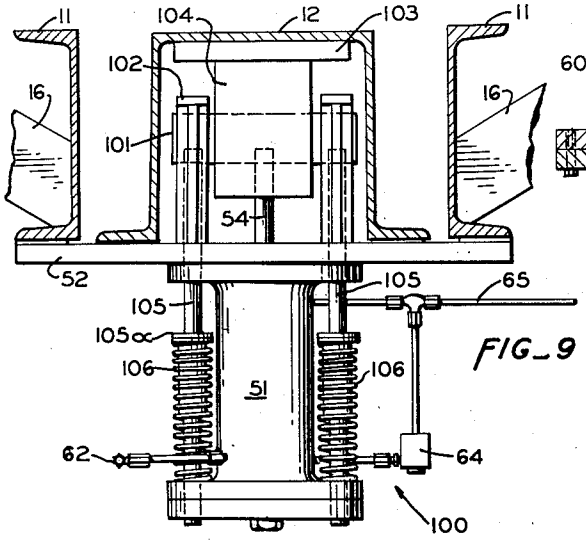


FIG_9



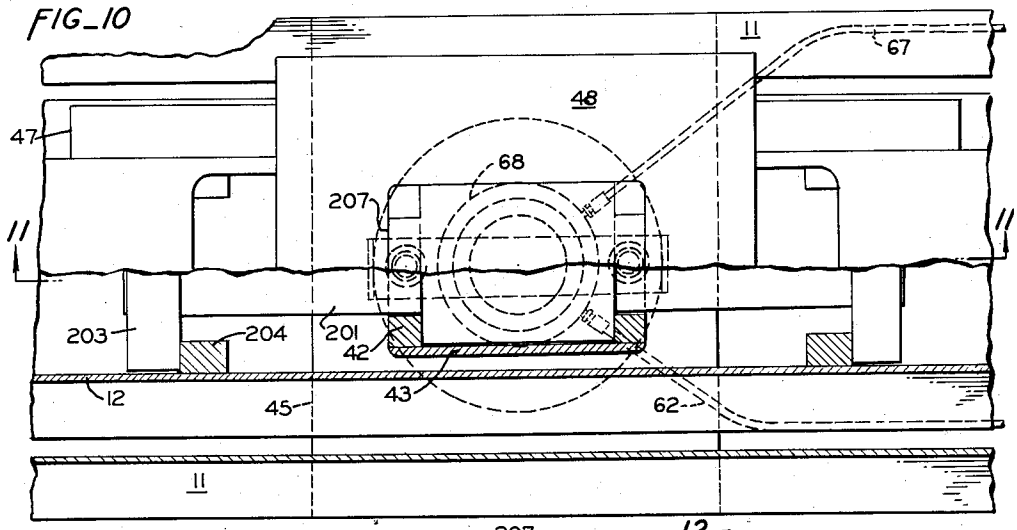
INVENTOR.
WILLIAM K MacCURDY
BY Mellin and Hanscom
ATTORNEYS

Nov. 3, 1959 W. K. MacCURDY 2,911,112

DRAFT GEAR FOR RAILROAD CARS

Filed Nov. 5, 1954 5 Sheets-Sheet 5

FIG_10



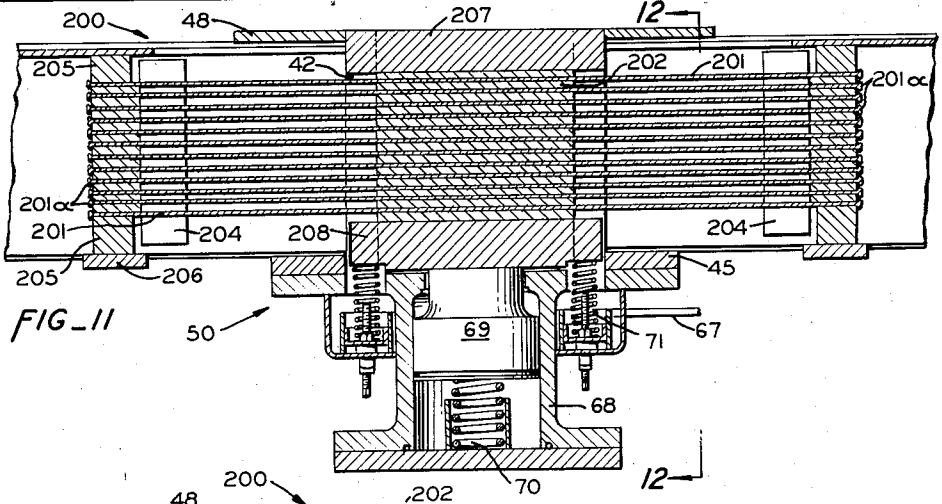


FIG_11

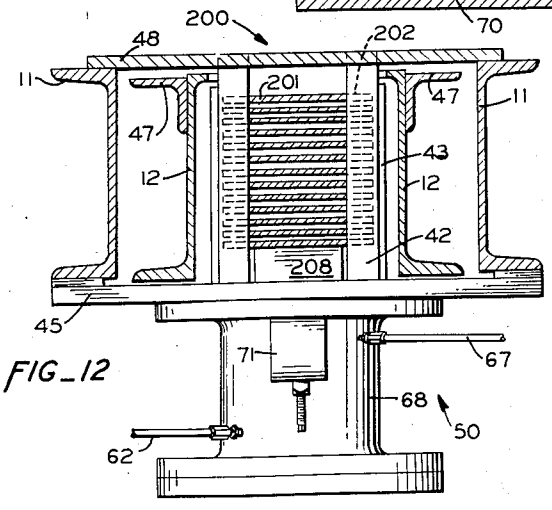


FIG_12

INVENTOR.
WILLIAM K MacCURDY
BY Mellin and Hanscom
ATTORNEYS

United States Patent Office 2,911,112 Patented Nov. 3, 1959

2,911,112

DRAFT GEAR FOR RAILROAD CARS

William K. MacCurdy, Menlo Park, Calif., assignor, by mesne assignments, to Southern Pacific Company, San Francisco, Calif., a corporation of Delaware

Application November 5, 1954, Serial No. 467,118

13 Claims. (Cl. 213—8)

This invention relates to and in general has for its object the provision of improved draft gear for railroad cars.

As is well known in the industry, a very substantial loss is suffered annually by railroads as a result of freight damaged by the jarring of freight cars during the operation thereof particularly in retarder yards. This loss still occurs in spite of the fact that many attempts have been made to devise satisfactory mechanisms for cushioning the impact to which freight cars are subjected and to devise systems for controlling and limiting the speeds of cars in retarder yards.

More specifically one of the objects of this invention is the provision of draft gear including a draft sill paralleling the main sill of a freight car and longitudinally movable relative thereto under the influence of an impact to which the car is subjected; a hydraulic press mounted on one of said sills; two sets of interdigitated friction plates operatively disposed in said press, one set being secured to one sill and the other set to the other sill; a hydraulic pump mounted on one of said sills and operatively connected to said hydraulic press; and means responsive to the relative movement of said sills for actuating said hydraulic pump thereby to activate said hydraulic press and squeeze said friction plates and thereto restrain the relative movement of said sills.

A further object of this invention is the provision in draft gear such as above described of friction plates movable with the draft sill and which are maintained under tension rather than compression during the dampening action of the draft gear.

Still another object of this invention is the provision of draft gear of the character described, wherein the hydraulic pump is provided with a metering pin for controlling the pressure developed throughout the working medium.

The invention possesses other advantageous features, some of which, with the foregoing, will be set forth at length in the following description where those forms of the invention which have been selected for illustration in the drawings accompanying and forming a part of the present specification, are outlined in full. In said drawings, several forms of the invention are shown, but it is to be understood that it is not limited to such forms, since the invention as set forth in the claims may be embodied in other forms.

Referring to the drawings:

Figure 1A is a top plan view of the end of a freight car sub-frame including draft gear embodying the objects of my invention and with portions thereof broken away to better illustrate its construction.

Figure 1B is a continuation of the sub-frame and draft gear disclosed in Figure 1A, its right-hand end terminating at about the longitudinal midpoint of the sub-frame.

Figure 2A is a vertical midsection of the structure illustrated in Figure 1A.

Figure 2B is a vertical midsection of the structure illustrated in Figure 1B, with portions thereof broken away to better illustrate its construction.

Figure 3 is a transverse vertical section taken on the section line 3—3 of Figure 2B.

Figure 4 is a view similar to that illustrated in the right-hand end of Figure 2B, but somewhat enlarged and showing the piston of the hydraulic pump at the end of its work stroke.

Figure 5 is an enlarged vertical transverse section taken on the section line 5—5 of Figure 2B.

Figure 6 is an enlarged transverse vertical section taken on the section line 6—6 of Figure 2A.

Figure 7 is a top plan view of a modified form of hydraulic pump actuating element.

Figure 8 is a longitudinal vertical section of the hydraulic pump actuating element illustrated in Figure 7.

Figure 9 is a right-hand end elevation of the structure shown in Figure 8.

Figure 10 is a top plan view of an alternate friction plate assembly.

Figure 11 is a vertical midsection of the assembly illustrated in Figure 10.

Figure 12 is a right-hand end elevation of Figure 10.

General Description

Briefly the structure disclosed in Figures 1A to 6 inclusive comprises a freight car sub-frame including a main sill extending the length thereof. Mounted adjacent the main sill in parallelism therewith is a draft sill protruding beyond the main sill at each end thereof. Supported by the main sill intermediate its ends is a hydraulic press and operatively disposed therein are two interdigitated sets of friction plates, one fastened to the main sill and the other fastened to and movable with the draft sill. Mounted on one of the sills is a hydraulic pump operatively associated with the hydraulic press, and operatively associated with said sills is means responsive to any relative movement thereof for actuating said pump, thereby to increase the pressure between the two sets of friction plates and to thus retard the movement of the draft sill relative to the main sill.

Car sub-frame and sill assembly

More specifically the structure disclosed in Figures 1A to 6 inclusive comprises a freight car body center sill **11** surrounding a draft sill **12** and representing the underframe of the car body. Forming a part of said underframe are end sills **13**, bolsters **14**, crossbearers **15** and cross ties **16**, all essentially of standard design and modified only to accommodate for the wider spacing of the center sill **11** and to provide proper support and clearance for the sliding draft sill **12**. Most radically affected by these requirements is the combined center plate and bolster bottom tie **17** shown in the drawing as a single casting, but which can be of built-up welded design.

Coupler assembly

Associated with each end of the draft sill **12** is a standard coupler **18** provided with a slotted shank **19**, a coupler carrier **20**, coupler yoke **21**, coupler key **22**, yoke carrier **23**, draft gear **24**, front draft lugs **25** and rear draft lugs **26**. As is well known in the art, this structure will absorb buffing shocks of certain magnitudes before affecting the car body center sill **11**. However, the ends of the draft sill **12** project sufficiently beyond the end sills **13** to permit a movement of the sill **12** relative to the center sill **11** of about ten inches in either direction.

As shown in the drawings the position of the draft sill **12** relative to the center sill **11** is determined by a spring return centering assembly generally indicated by the reference numeral **27** and by a simultaneously function-

ing hydraulically actuated friction mechanism generally indicated by the reference numeral **28**. Preferably one such assembly and mechanism is installed at each end of the freight car.

Spring return centering assembly

More specifically the spring return centering assembly **27** comprises a pair of coil springs **29** engaged at their ends by follower plates **30** carried by guide angles **31** and guided by bars **32**. Conveniently the angles **31** and bars **32** can be secured to the inside faces of the draft sill **12**, lugs **33** secured to the top flanges thereof serving as seats or stops for follower plates **30**. Similarly and for a like purpose, lugs **34** are attached to the center sill bottom tie plates **35**. Optionally the springs **29** can be housed in tubes **36**, a rod **37** extending through the springs **29** and follower plates **30** with positive clearance, being used to facilitate the installation and removal of the springs. It will be seen that as a result of this construction, the movement of the draft sill **12** relative to the center sill **11** in either direction will compress the springs in an amount proportional to the relative movement between these sills, and that the springs will exert an equal and opposite reaction on the sills.

Friction plate assembly

In effect the friction mechanism **28** constitutes a multiple plate brake and includes a first set of long, sliding friction plates **38** interdigitated with a second set of relatively short, fixed or stationary friction plates **39**. Preferably, and as illustrated, the plates **38** and **39** are of inverted V-shape to provide for greater column strength when the plates function under compression but can be made flat if, as shown in Figures 10, 11 and 12, they are made to function under tension.

Removably secured to the draft sill **12** and movable therewith are a pair of longitudinally spaced plates **40** reinforced by ribs **41**, the sliding friction plates **38** being accommodated between the plates **40** and therefore constrained to move therewith under the pushing action of one of the plates **40**.

Forming a stationary or fixed retainer for the friction plates **39** are two laterally spaced pairs of posts **42**, there being one pair of such posts located on each side of the sliding friction plates **38** and each such pair of posts being welded to a longitudinally extending side plate **43**. Welded between and to the upper ends of the posts **42** is a pressure block **44** having an inverted V-shaped bottom conforming to the contour of the friction plates **38** and **39**. Bolted to and across the bottom of the center sill **11** (Figure 6) below the plates **38** and **39** is a tie plate **45** and mounted on the plate **45** is a vertically movable pressure block or saddle **46** for supporting the two interdigitated sets of friction plates **38** and **39**, the plates **39** being confined with the retainer formed by the posts **42** and plates **43**. Here it should be noted that the ends of the stationary friction plates **39** abut the posts **42** and are therefore restrained against longitudinal movement, that the sliding friction plates **38** pass between the posts **42** with positive clearance but are seated between the plates **40** and are therefore constrained to move with the draft sill **12**.

To clear the pressure block **44** the top flanges of the draft sill **12** are cut out and the sill reinforced at this point by angles **47**. Formed as an integral part of the center sill **11** is a top tie plate **48**, the center thereof being cut out for the snug reception of the top of the pressure block **44**. These expedients are resorted to only because the draft gear here under consideration is being installed on a freight car sub-frame of conventional construction, and not on a sub-frame specifically designed to accommodate such draft gear.

Hydraulic pump assembly

Associated with the friction mechanism **28** above described is a hydraulic pump assembly generally designated by the reference numeral **49** and a hydraulic press generally designated by the reference numeral **50**.

As best shown in Figures 4 and 5, the hydraulic pump **49** comprises a master cylinder **51** secured to the center sill bottom plate **52**, a piston **53** operatively disposed within the cylinder **51**, a piston rod **54** secured to said piston, a cross head **55** secured to the free end of said piston rod, and a mechanical linkage between the cross head and the draft sill **12** whereby any movement of the latter relative to the center sill **11** will actuate the piston **53**. To this end, there is pivoted to the cross head **55** a pair of opposed channels **56**, these channels in turn being pivoted at their ends to the upper ends of depending links **57**. The lower end of each of the links **57** is pivoted to a bracket **58** bolted or otherwise secured to the draft sill **12**. Secured to the sill bottom plate **52** are a pair of guide members **59** of I-beam cross-section for constraining the cross head **55** and channels **56** to move vertically and thereby causing the piston **53** to move within the cylinder **51**. Any translatory motion of the draft sill **12** from its neutral or center position as illustrated in Figure 2B, will cause the links **57** and channels **56** to move from their positions as shown in Figure 2B toward their positions as shown in Figure 4 and perforce cause the piston to travel downwardly.

From an inspection of Figure 4 it will be noted that the piston **53** is provided with an axial bore **60** having a restricted throat **60a** and intersected by a transverse bore **60b**. Mounted on the lower end of the cylinder **51** coaxially therewith is a metering pin **61** extending into bore **60** and so shaped as to control the rate of flow of working medium through the restricted throat **60a** and thus determine the desired pressure. Connected to the bottom of the cylinder **51** are conduits **62** and **63**, the former communicating with the hydraulic press **50** and the latter to the lower end of a relief valve **64**. Connected with the upper end of the cylinder **51** and with the upper end of the relief valve **64** is a conduit **65** leading to the bottom of a working medium reservoir **66**. The reservoir is open to atmosphere and communicates through a conduit **67** with the hydraulic press **50**.

Hydraulic press

Secured to the center sill bottom plate **45** is a closed cylinder **68** and slidably disposed within said cylinder is a piston **69** supported by an intermediate spring **70**. Supported by the cylinder **68** adjacent its side walls, is a pair of diametrically opposed springs **71** extending through the top of the cylinder and through the plate **45** into engagement with the pressure block or saddle **46**, thereby to subject the friction plates **38** and **39** to an initial predetermined pressure.

As best indicated in Figure 6, the conduit **62** communicates with the lower end of the cylinder **68** whereby the conduit **67** is connected to the upper end thereof. Establishing communication between the upper and lower ends of the cylinder **68** is a conduit **72**, a check valve **73** being interposed in this conduit so as to permit only the downward flow of working medium therethrough.

Operation

As a result of the above construction it will be seen that any translatory movement of the draft sill **12** relative to the main sill **11** activates the hydraulic pump assembly **49**. More specifically the movement of the piston **53** results in the flow of fluid through the bore **60** and over the metering pin **61**, this flow being accompanied by a pressure below the piston and therefore throughout the rest of the hydraulic system, all in accordance with well known hydraulic principles. There is essentially no flow of liquid in the usual sense, except from below to above the piston **53**, but rather there is a shock or pressure wave transmitted through the liquid which acts directly against the piston **69** and which in turn must be

held firmly against the friction plates at all times. Pressure so developed by the pump assembly is transmitted through the conduit **62** to the cylinder **68** of the hydraulic press **50** thereby to activate the piston **69** and compress the interdigitated sets of friction plates **38** and **39**. Since one set of plates is fixed to the car main sill **11**, and since the other set moves with the draft sill **12**, any movement of the draft sill away from its neutral or center position will be retarded by the compression of the two sets of friction plates. Furthermore since the compression of the friction plates proceeds in response to the relative movement of the two sills, the draft gear described may be characterized as being of the servo type.

Preferably the braking action of the friction plates **38** and **39** should be proportional to the impact on the draft sill **12** causing relative motion between the two sills. Since the movement of the draft sill **12** is proportional to such impact, it can be said that the braking of the friction plates should be proportional to the movement of the draft sill. In the modification of the device above described, the movement of the pump piston **53** is not directly proportional to the movement of the draft sill **12**, but rather a function of tan α, α being the angle between the links **57** and a vertical reference line. To compensate for this, and to make the pressure applied by the hydraulic press **50** to the friction plates **38** and **39** directly proportional to the impact on the draft sill, the metering pin **61** of the hydraulic pump piston **53** may be shaped as required. The same objective could of course be attained by any analogous method which will vary the flow of the working medium in the same manner during the stroke.

Modified hydraulic pump assembly

In Figures 7, 8 and 9 still another alternative for making the braking action of the friction plates **38** and **39** directly proportional to the movement of the draft sill **12** has been illustrated. Here the system is exactly the same as shown in Figures 1A to 6 inclusive, except with respect to the mechanism for activating the hydraulic pump. For purposes of ready reference and comparison, all parts to which no change has been made will be identified by the corresponding reference numerals used in conjunction with Figures 1A to 6 inclusive, whereas new or altered parts will be indicated by a new set of reference numerals beginning with the number 100.

Included in the modified hydraulic pump assembly generally designated by the reference numeral **100** is the cylinder **51** which as previously described is secured to the center sill bottom plate **52**; piston **53**, piston rod **54**, and a crosshead **101** having oppositely inclined upper faces **101a** and **101b**. Mounted on the bottom plate **52** are four guides **102** of T-cross section for constraining the crosshead **101** and the piston rod **54** to move only vertically. Secured to the draft sill **12** is a mounting plate **103** and fastened thereto is a cross-head actuating plate **104**, provided on its lower side with a pair of opposed and converging inclined planes **104a** and **104b** respectively, complementary to the faces **101a** and **101b**. Slidably mounted in the top and bottom plates of the cylinder **51** and in the center sill bottom plate **52**, are a pair of rods **105** the upper free ends of which are seated in recesses formed in the outer ends of the crosshead **101**. Surrounding each of the rods **105** is a coil spring **106** seated at its upper end against a washer **105a** secured to the rod and supported by the bottom plate of the cylinder. The springs **106** therefore serve to maintain the crosshead **101** in positive and sliding engagement with the inclined planes **104a** and **104b**.

As a result of this construction it will be seen that any movement of the draft sill **12** in either direction will serve to depress the crosshead **101** and its associated piston **53**, and that the downward movement of the piston is a straight line function of the movement of the draft sill **12**. The contour of the metering pin **61** can therefore be easily fashioned to translate the movement of the piston **53** into a force applied by the hydraulic press to the friction plates **38** and **39** such that the braking force effected by the plates **38** and **39** will be directly proportional to any impact to which the draft sill may be subjected and which is sufficient to effect any appreciable movement of the draft sill.

Alternate construction of friction plate assembly

In the friction plate assembly illustrated in Figures 1A, 2A and 6, the movement of the draft sill **12** is transmitted to slidable friction plates **38** by the pushing action of the trailing plate **40**. As previously stated the column strength of a relatively thin plate is low and it is for that reason that friction plates of V shape section are resorted to in Figures 1A, 2A and 6. Although a relatively thin but long plate lacks strength when placed under longitudinal compression, it nevertheless has considerable longitudinal tensional strength. In the modification illustrated in Figures 10, 11 and 12, advantage is taken of this phenomena by so arranging the friction plate assembly that the sliding friction plates **38** are pulled by the draft sill **12** in response to any movement of said sill in either direction. Here again the reference numerals heretofore used will be applied to identical parts and new reference numerals beginning with 200, reserved for new or modified parts or elements.

More specifically the friction plate assembly disclosed in Figures 10, 11 and 12, and generally indicated by the reference numeral **200**, include a first set of relatively long and narrow sliding friction plates **201** interdigitated with a second set of relatively short stationary or fixed friction plates **202**. Disposed between the ends of plates **201** in abutment with shoulders **201a** formed on the ends of the plates **201** are follower bars **203**. Secured to the draft sill **12** inwardly of the follower bars **203** and in contact therewith are lugs **204**. To securely lock the ends of the friction plates **201** to the follower bars **203**, filler blocks **205** are snugly fitted between the uppermost friction plate **201** and the top of the draft sill **12** and between the lowermost friction plate **201** and the draft sill bottom plate **206**. As a result of this construction the ends of the slidable friction plates are interdigitated with and firmly secured to the follower bars **203**, the bars **203** being in contact with the lugs **204**. Consequently draft sill **12** moves to the left as viewed in Fig. 11, and the left-hand lugs **204** will serve to pull the friction plates **201** to the left over the stationary friction plates **202**. When the draft sill moves to the right as viewed in Figure 11, the right-hand lugs **204** will pull the plates **201** to the right. In each case the plates **201** operate under tension rather than under compression whereby all possibility of buckling is obviated.

As in the case of the friction plate assembly illustrated in Figures 1A, 2A and 6, the stationary friction plates **202** are housed by the posts **42** welded to the side plates **43** and to an X-shaped block **207** fitted between the upper ends of the posts **42**. The lower ends of the posts **42** are welded to the center sill bottom tie plate **45** which in turn is bolted to the center sill **11**.

Disposed beneath the lowermost friction plate **202** and forming a support therefor is a block **208**. The remainder of the assembly is identical to the assembly originally described and therefore the elements thereof bear the same reference numerals.

It is evident that in all modifications of the general combination herein described a moderate end impact on the draft sill will produce a moderate pressure on the friction plates resulting in a moderate retardation in the relative movement between the draft sill and the center sill. Under a larger impact load, the velocity of the draft sill will be greater, thereby resulting in a greater velocity of the piston of the hydraulic pump and the application of a greater pressure by the hydraulic press to the friction plates. In other words the pressure applied to the

friction plates is always proportional to the velocity of the impact on the draft sill. Furthermore as the pressure on the friction plates is reducted, the centering mechanism 27 will return the draft sill 12 to its neutral position relative the center sill 11.

I claim:

1. Draft gear for a railroad car having a stationary part and a movable part movable relative to said stationary part in opposite directions from normal at-rest position, said draft gear comprising: a hydraulic press having opposed, spaced pressure plates; a stack of first and second sets of interdigitated friction plates operatively disposed in said press in confronting face to face relationship with and between said pressure plates for compression thereby, the friction plates of one set of plates being arranged for sliding movement over the friction plates of the other set of plates; one of said sets of friction plates being connected to said stationary part of said railroad car and the second of said sets of friction plates connected to and movable with said relatively movable part of said car, spring means biasing said pressure plates together; a hydraulic pump for actuating said hydraulic press; and means for actuating said hydraulic pump in response to movement of said movable part relative to said stationary part in a direction away from said normal at-rest position.

2. Draft gear such as defined in claim 1 wherein said hydraulic pump includes a cylinder; a piston slidable in said cylinder and formed with an axial bore; and a tapered metering pin secured to one end of said cylinder coaxially therewith and extending into said bore for determining the rate of flow of liquid through said bore thus determining the pressure applied to said hydraulic press.

3. Draft gear for railroad cars comprising: a car subframe sill; a draft sill paralleling said sub-frame sill and arranged for longitudinal movement relative thereto; means engaging said sills and biasing said draft sill against movement relative to said subframe sill in a direction away from a normal at-rest position; a first set of friction plates fixed to said subframe sill; a second set of friction plates fixed to said draft sill, the plates of said second set being interdigitated with the friction plates of said first set to form a stack; a hydraulic press mounted on one of said sills and having opposed pressure plates straddling said interdigitated friction plates and engaging the outer faces of the outer plates of the stack; a hydraulic pump mounted on one of said sills; means for conducting fluid between the pump and press for actuating said press by the pump; and means responsive to movement of said draft sill in a direction away from said normal at-rest position for actuating said pump.

4. Draft gear such as defined in claim 3 wherein said hydraulic pump includes a cylinder; a piston slidable in said cylinder and formed with an axial bore; and a tapered metering pin secured to one end of said cylinder coaxially therewith and extending into said bore for determining the flow of liquid through said bore thereby to determine the pressure applied to said hydraulic press.

5. Draft gear for a railroad car having a stationary part and a movable part movable relative to said stationary part in opposite directions from a normal at-rest position, said draft gear comprising: a hydraulic press; first and second sets of interdigitated friction plates disposed in confronting face to face relationship in said press for the application of compressive force thereby to the plates normal to their faces, the friction plates of one set of plates being arranged for sliding movement over the friction plates of said second set of friction plates, the plates of the first set being connected to and movable with said movable part and the plates of the second set being connected to said stationary part; means operatively connected to said plates and biasing said plates together; and means for actuating said hydraulic press in response to movement of said movable part of the car relative to said stationary part and in a direction away from said normal at-rest position, thereby to squeeze said plates together.

6. Draft gear for a railroad car having a stationary part and a movable part movable relative to said stationary part in opposite directions from a normal at-rest position, said draft gear comprising: a hydraulic press; first and second sets of interdigitated friction plates disposed in confronting face to face relationship in said press for the application of compressive force thereby to the plates normal to their faces, the friction plates of one set of plates being arranged for sliding movement over the friction plates of said second set and the plates of the first set being connected to and movable with said movable part and the plates of the second set being connected to said stationary part; a hydraulic pump for actuating said hydraulic press, said pump including a cylinder, a piston slidable in said cylinder and formed with an axial bore; a tapered metering pin secured to one end of said cylinder coaxial therewith and extending into said bore for determining the pressure applied to the hydraulic press; and means responsive to movement of said movable part of the car relative to said stationary part and in a direction away from said normal at-rest position for actuating said hydraulic pump.

7. Draft gear for railroad cars comprising: a car subframe sill; a draft sill paralleling said subframe sill and arranged for longitudinal movement relative thereto in opposite directions from a normal at-rest position; a first set of friction plates fixed to said frame sill; a second set of friction plates fixed to said draft sill, the plates of said second set being interdigitated in confronting face to face relationship with the friction plates of said first set to form a stack; a hydraulic press mounted on one of said sills and acting on the outer faces of the outer plates of the stack to compress said plates; a hydraulic pump mounted on one of said sills for actuating said press; means responsive to movement of said draft sill relative to said subframe sill and in a direction away from said normal at-rest position for actuating said pump, said pump including a cylinder and a piston slidable therein and formed with an axial bore; and a tapered metering pin secured to one end of said cylinder coaxially therewith and extending into said bore for determining the flow of liquid through said bore thereby to determine the pressure applied to said hydraulic press by the pump.

8. Draft gear for a railroad car having a stationary part and a movable part movable relative to said stationary part in opposite directions from a normal at-rest position, said draft gear comprising: a hydraulic press; first and second sets of interdigitated friction plates operatively disposed in confronting face to face relationship in said press for the application of compressive force thereby to the plates normal to their faces, the plates of one of said sets being connected to and movable with said relatively movable part of said railroad car and being arranged for sliding movement parallel to the planes of their faces over the plates of the other of said sets, the plates of said other of said sets being connected to said stationary part of said car; and means connected to one of said parts responsive to movement of said movable part of said car relative to said stationary part and in a direction away from said normal at-rest position for actuating the press to compress the plates.

9. Draft gear as defined in claim 8 wherein said last named means includes a cylinder, a piston in said cylinder and co-operating therewith to define a pressure chamber, means responsive to said relative movement in said direction to move said piston in a direction to reduce the size of said pressure chamber, means providing for fluid flow from said chamber, and means for variably restricting said flow to vary the pressure within said chamber during said piston movement, said including means for transmitting the fluid pressure within said pressure cham-

ber to said plates to increase the pressure between said interengaging faces of said interdigitated plates.

10. Draft gear as defined in claim 9 wherein said means for variably restricting said flow comprises means defining an axial bore in said piston and a tapered metering pin secured to one end of said cylinder coaxial with said bore and movable into said bore for variably restricting the flow of fluid through said bore to vary the pressure within said chamber.

11. Draft gear as defined in claim 8 wherein said last named means is responsive to the rate of movement of said movable part relative to said stationary part in a direction away from said normal at-rest position.

12. Draft gear as defined in claim 8 wherein said last named means is responsive to the rate of movement and displacement of said movable part relative to said stationary part and in a direction away from said normal at-rest postion.

13. In a railway car having an underframe member and a draft sill member mounted on said underframe member for longitudinal movement relative thereto in opposite directions from a normal at-rest position, the combination of two sets of friction plates with the plates of one set interdigitated with those of the other in confronting face to face relationship to form a stack with the faces of the plates parallel to the direction of movement of the draft sill member, means connecting the plates of the first set to said underframe member against longitudinal movement relative thereto, means connecting the plates of the second set to the draft sill member for movement therewith longitudinally of said underframe member, means responsive to movement of said draft sill member relative to said underframe member and in a direction away from said normal at-rest position to apply a compressive force to said stack of plates normal to the faces thereof, said last named means including a cylinder mounted on one of said members, a piston reciprocably mounted within said cylinder, means carried by said cylinder and biasing said piston in one direction relative to said cylinder, co-operating means on the other of said members and on said piston and responsive to longitudinal movement of said draft sill member relative to said underframe member and in a direction away from said normal at-rest position to move said piston in the direction opposite to said direction of said first mentioned piston movement to provide a working pressure within said cylinder at one side of said piston, means for conducting fluid between the parts of the cylinder at opposite sides of the piston for controlling said working pressure at said one side of the piston, and means engaging the outer faces of the outer plates of said stack and responsive to said working pressure within said cylinder at said one side of said piston to apply a compressive force to said stack of plates normal to the faces thereof.

References Cited in the file of this patent

UNITED STATES PATENTS

715,990	Courson	Dec. 16, 1902
2,527,290	Anderson	Oct. 24, 1950