April 1, 1941. C. C. AUEL 2,237,171

DRAFT GEAR

Filed Dec. 2, 1938 2 Sheets-Sheet 1

Fig. 1.

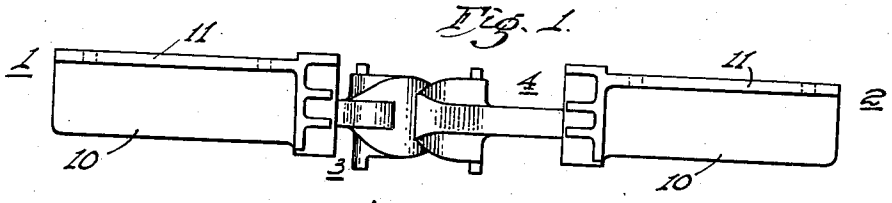


Fig. 2.

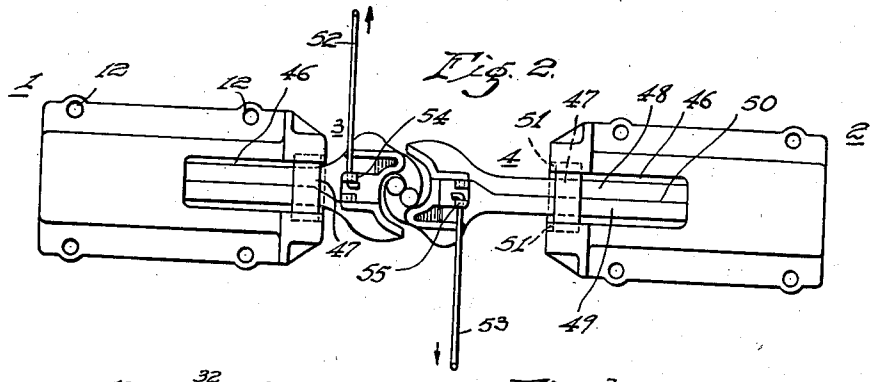


Fig. 3.

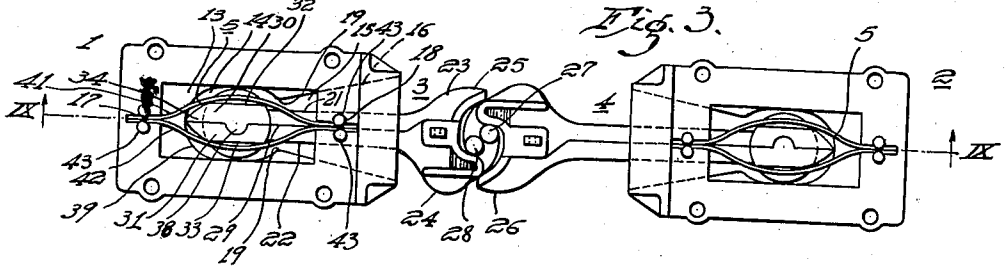
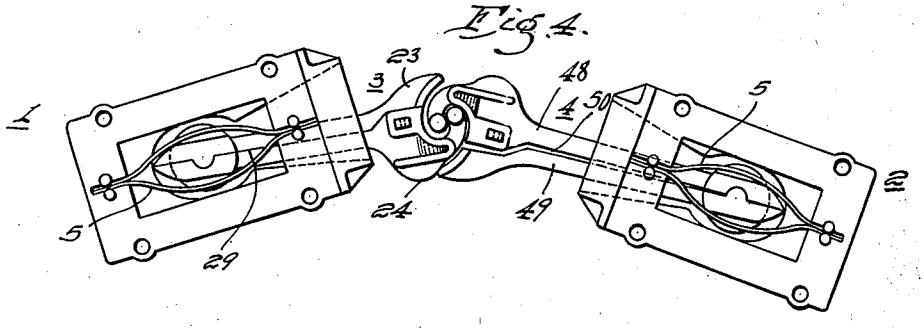


Fig. 4.



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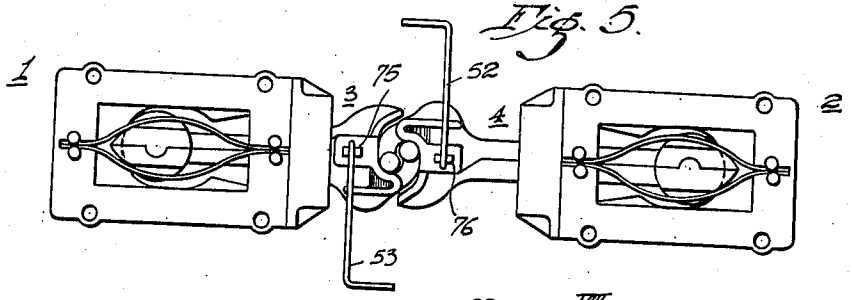
ATTORNEY

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Filed Dec. 2, 1938 2 Sheets-Sheet 2

Fig. 5.



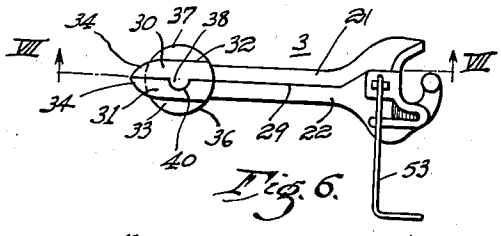


Fig. 6.

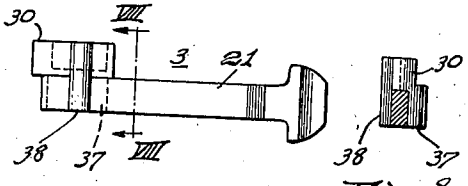


Fig. 7.

Fig. 8.

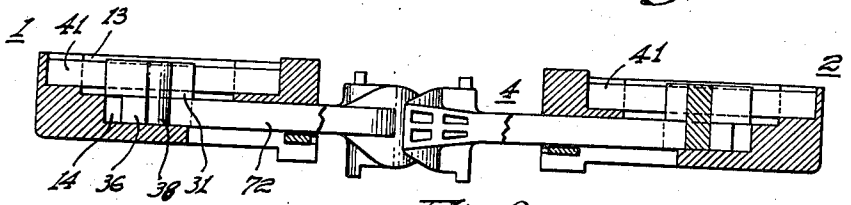


Fig. 9.

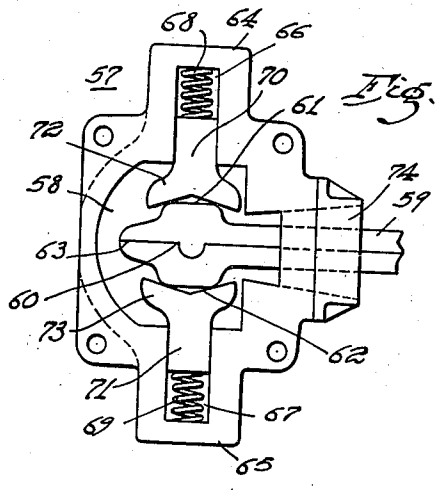


Fig. 10.

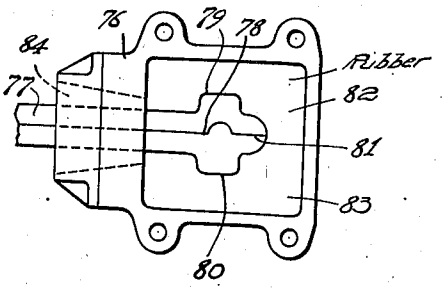


Fig. 11.

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UNITED STATES PATENT OFFICE

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DRAFT GEAR

Carl C. Auel, Irwin, Pa.

Application December 2, 1938, Serial No. 243,534

5 Claims. (Cl. 213—20)

My invention relates to a draft gear, and it has particular relation to a draft gear for toy or miniature railway vehicles.

One object of my invention is to provide a draft gear, particularly for toy or miniature vehicles, that shall be more satisfactory and complete in its functions than those at present on the market.

Another object of my invention is to provide a relatively simple draft gear structure embodying resilient means, preferably a single elliptical spring, for performing one or more of the following functions:

(a) Yieldingly restraining the pushing and pulling action of the drawbar.

(b) Centering the drawbar.

(c) Biasing the split parts of the drawbar together.

A further object of my invention is to provide a draft gear or coupler for toy vehicles which has the general outward appearance and proportions of a conventional type full-size railway coupler or draft gear, but which is split lengthwise into two parts so as to permit it to be automatically coupled in the conventional fashion by bumping two vehicles together.

Other objects of my invention will become evident from the following detailed description, taken in conjunction with the accompanying drawings in which:

Figure 1 is a view in side elevation, Fig. 2 in bottom plan, and Fig. 3 in top plan of a draft gear or coupler constructed in accordance with my present invention;

Fig. 4 and Fig. 5 are views corresponding to Fig. 3 showing the draft gear in various phases of its operation;

Fig. 6, Fig. 7 and Fig. 8 are detailed views of certain of the parts shown in the preceding figures, Fig. 8 being a sectional view taken along the line VIII—VIII of Fig. 7;

Fig. 9 is a view, partially in elevation but mainly in longitudinal section, along the line IX—IX of Fig. 3; and

Figs. 10 and 11 are top plan views of parts of draft gear embodying modifications of my invention.

Referring to the drawings, the apparatus shown therein comprises a pair of cooperating draft gear or coupler structures, respectively comprising frames or housings 1 and 2, drawbars 3 and 4 and resilient means 5 for cooperating with the drawbars within the frame or housing, as subsequently described.

Since the separate halves of the draft gear structure are alike, the half shown on the left-hand side of the figures will be described in detail, and only the differences between it and the half shown on the right-hand side of the figures will later be pointed out, in order to avoid unnecessary repetition in this specification.

The draft gear structure frame 1 comprises a boxlike member or receptacle 10 having top side flanges 11 provided with apertures 12 to permit securing the apparatus to the under side of a toy railway vehicle or the like.

As will be noted from Figs. 3 and 9, the box or receptacle portion 10 comprises a recessed portion or pocket including an intermediate shelf or ledge 13 and a bottom shelf or ledge 14 which is centrally located and which merges into a neck 15 which extends toward the right-hand end of the frame 1, providing a working opening or bellmouth slot, as indicated by the reference character 16, for the corresponding drawbar 3. Oppositely disposed stops 19, located at the base of neck 15, are provided for a purpose to be described.

The ends of the frame on its top surface are provided with centrally located, longitudinally extending slots 17 and 18 for the purpose of receiving the ends of the resilient means or spring member 5, as subsequently described.

The drawbar 3 comprises a plurality of longitudinally extending portions 21 and 22 which respectively terminate outside of frame 1 in cooperating drawbar head portions 23 and 24. It will be noted that the drawbar heads present the same general outward appearance and proportions as the drawbar heads of couplers on full-size railway vehicles, the portion 23 ending in a guiding or overhanging lip 25 and having an interlocking or knuckle portion 27, while the cooperating drawbar 4 includes similar parts 26 and 28 which are reversely disposed with respect to the parts 23 and 24, in accordance with usual coupler practice.

The drawbar parts 21 and 22 are split longitudinally along the line 29, and with particular reference to Figs. 6, 7 and 8, preferably integral bearing members comprising oppositely disposed upper portions 30 and 31 (each having tail portions 34) and lower portions 36 and 37 constitute the inner ends of the drawbar portions 22 and 21, respectively. As will be noted from Fig. 8, the lower portion 37 is outwardly offset with respect to the upper portion 30, the two portions, however, being preferably integrally related, although this is not necessary. The lower portion 37 is semi-cylindrical to provide a rotary bearing

surface on the vertical walls of ledge 14. To maintain the portions 21 and 22 in proper relation, portion 21 is provided with a preferably integral half-round vertically-extending protuberance 38 and portion 22 with a corresponding groove or recess 40. The parts 21 and 22 thus are pivotally related and open and close as conditions require, being biased to closed position by springs 5.

The upper portion 31 has a flattened longitudinally extending surface 32 for a purpose to be described.

The other half of the drawbar 3 is provided at its inner end with similar parts, namely, a lower semi-cylindrical portion 36 and an upper offset portion 31 having a flattened surface 33.

The resilient means 5 is shown as comprising a single elliptical spring having oppositely disposed leaves 41 and 42 extending edgewise longitudinally of the frame 1 and having the ends thereof fitted within the slots 17 and 18 in the frame. In order to anchor the spring ends in such slots, the material of the frame immediately adjacent thereto may be prick punched or otherwise distorted, but preferably small integrally cast pins are flattened out, as in a vise, as indicated by the reference characters 43, for this purpose.

It will be noted that the upper bearing portion of the drawbar comprising the flattened parts 30 and 31 is disposed between the opposite leaves of the elliptical spring 5 which tightly grips or bears upon the edges of the flattened portions 32 and 33 under normal conditions, as indicated in Fig. 3. The said bearing portion is thus disposed in the same plane as the elliptical spring 5, while the drawbar portions 21 and 22 are disposed in a lower plane utilizing the deepest part or ledge 14 of the recessed frame 1 and extending through the end openings 16 thereof. The coupler portions 1 and 2 are provided with forward and backward stops to prevent undue distortion of spring 5 when the drawbar is pushed or pulled within the recessed portion or pocket of the frame. The rear wall 39 of ledge 14 serves as a back stop and oppositely disposed stops 19 serve as forward stops.

Thus, when the draft gear functions, in addition to the spring effect per se, there is a double friction effect, both effects tending to absorb any operating shocks. This double friction effect is produced by the sliding action of the drawbar in the frame and by the sliding action of the springs on the parts enclosed and gripped thereby.

The cooperating draft gear portion comprising the frame 2 and the drawbar 4 is very similar to the parts previously described, except that the split drawbar parts 48 and 49 and the split 50 between them are longer than the corresponding parts 21 and 22 of the drawbar 3, thus giving a wider lateral swing at the coupler head which is necessary on passenger cars because of their greater overhang at the car ends on curves. Thus coupler 1 is particularly adapted for freight cars and coupler 2 for passenger cars.

Longitudinally extending slots 46 are provided in the box-like portions 10 of each coupler to permit ready assembly of the corresponding drawbar portions, and brass or other metal bridges 47 are tightly fitted into receiving slots 51 to prevent the drawbars working out of their horizontal planes.

In order to easily and quickly uncouple the drawbar heads from the coupled position shown in Fig. 2, for example, rods 52 and 53 are provided with hooked ends which may be hooked around small integrally cast apertured lugs 54 and 55 on the lower side of the respective coupler heads to simulate full-size bottom-operated couplers or the hooked ends of the rods 52 and 53 may be hooked into small lugs 75 and 76 on the tops of the couplers to simulate full-size top-operated couplers, as shown in Fig. 5.

In either case, by slight transverse pulls on the rods 52 and 53, the split couplers readily disengage. As noted above, the coupling operation is automatically effected by simply pushing or bumping the coupler heads together, and the rods 52 and 53 are not needed for this operation.

As a result of the illustrated construction and arrangement of parts, it will be noted that the resilient means or elliptical spring 5 performs three distinct functions as follows:

In the first place, as the toy vehicles to which the respective draft gear portions are attached pass around a curve in a track, the parts may occupy a position similar to that illustrated in Fig. 4, in which, depending upon the direction of the curve, the drawbar heads extend toward and possibly contact the corresponding faces of the bell mouth slot 16, for example, the split parts, such as 21 and 22, of the drawbar being slightly separated along the split 29, but the knuckle or interlocking portions 27 and 28 maintaining their grip.

It will be noted that the upper bearing portion comprising the parts 30 and 31 and tailpieces 34 has assumed an angular position wherein only diagonally opposite corners are gripped by, and, therefore, spread apart, the leaves 41 and 42 of the elliptical spring 5.

In this way, a relatively great resilient swinging movement of the drawbars is permitted when the vehicles round a curve, which is especially necessary and desirable on toy or miniature railways where the curves are of a much shorter scale radii than are normally used on railroads. However, as soon as the vehicles are again running on a straight portion of the track, the elliptical springs 5, which tend to tightly grip the upper bearing portions in question, immediately cause centering of the drawbars so that they occupy the positions shown in Fig. 3.

The second function of the elliptical spring 5 is with respect to absorbing the thrust or the pushing or pulling action of the drawbars, either during running operation of the train or when the vehicles are bumped together for automatic coupling purposes, or when one coupler head pushes the other without being actually coupled together.

Fig. 5 represents the position of parts during an automatic coupling operation or when one vehicle is caused to push another. It will be noted that the bearing portions of the drawbars 3 and 4 have been pushed toward the outer ends of the elliptical springs 5, thus resiliently restraining the thrust of the drawbars. However, as soon as such thrusting force has been removed, the drawbars will be immediately returned by the gripping action of the elliptical springs 5 to the central positions illustrated in Fig. 3. It will be understood that during a pulling operation, the bearing portions will yieldingly occupy respective positions opposite to those shown in Fig. 5.

The third function of the elliptical spring 5 is to bias the split parts, such as 21 and 22 of the drawbar 3, together. When the vehicles are rounding a curve, as illustrated in Fig. 4, or dur-

ing the initial part of the automatic coupling operation, the parts necessarily separate to a certain extent, but as soon as normal conditions are restored, such as operating on a straight track or when the coupling operation has been completed, the elliptical springs **5** gripping the upper bearing portions cause the split parts to come together and occupy contiguous positions, as shown in Fig. 3.

It will be seen that I have thus provided a draft gear for toy model or miniature railway vehicles which is capable of performing all of the necessary operations, such as providing a spring effect, as well as a sliding friction effect of the draft-gear parts, to absorb shocks between vehicles when coupled together or when starting and stopping or when bumps occur to taking up and releasing slack in a train while in operation. In addition, the drawbars are provided with a self-centering action to bias the drawbar at all times towards the center of the coupler pocket, so that when the vehicles are not coupled and it is desired to do so, they may be readily coupled together without first taking the trouble to bring the couplers to center position. At the same time, the drawbars are permitted an easy swinging motion from side to side as the vehicle negotiates curves.

All of the functions mentioned are provided through the medium of resilient means, preferably a single elliptical spring, as a result of which a simple and inexpensive structure, which is not liable to get out of order, is provided, and at the same time the overall appearance and proportions of my toy coupler are the same as those of a conventional type full-size railway coupler.

Referring to the modification of my invention shown in Fig. 10, the structure there illustrated comprises a portion of a draft gear frame **57** having an internal pocket **58** with which a drawbar **59** having an enlarged head **60** operates. Drawbar **59** is preferably split, similar to the drawbar shown in previous figures. The enlarged head **60** is provided on opposite sides with flattened portions or faces **61** and **62** and with a tailpiece **63** on the side opposing the drawbar body proper.

The frame **57** is provided with lateral extensions **64** and **65**, respectively provided with recesses **66** and **67** for housing helical springs **68** and **69** which respectively bear against the outer ends of movable bearing members **70** and **71**, respectively having contact shoes **72** and **73** for bearing against the flattened faces **61** and **62** of the head **60** of the split drawbar **59**.

The drawbar **59** is adapted to be pushed or pulled within the pocket **58** and to swing from one side to the other within the limits of slots **74** provided in one side of the frame **57**.

Whenever the drawbar **59** is subjected to a push or a pull or a swing to one side or the other, the spring-pressed bearing members **70** and **71** tend to center the drawbar to the position illustrated and to resiliently cushion any backward or forward sliding movement of the head **60** between the shoes **72** and **73** as the drawbar is pushed or pulled and to bias the two cooperating parts of the split drawbar together.

Thus the resilient members or springs **68** and **69** serve a triple function with respect to the drawbar **59**.

The second modification of my invention shown in Fig. 11 comprises a frame **76** within which a drawbar **77** having an enlarged head **78** operates. Drawbar **77** is preferably of the split type as shown in previous figures. Opposing faces **79** and **80** of the head **78** are flattened and a tailpiece **81** is also provided on the drawbar.

In lieu of the previously illustrated metal springs employed in the other forms of my invention, in this case a block of suitable live rubber **82** is disposed within a pocket **83** in the frame **76**. This block of rubber may be either cast in place around the drawbar when in its illustrated central position or a recess corresponding exactly to the outline of the split drawbar head **78** and the adjacent parts of the drawbar may be cut out of a preformed rubber block and the drawbar parts disposed in said recess.

A wide mouth slot **84** is provided at one end of the frame **76** to permit swinging movement of the drawbar **77**.

In this form of my invention, whenever the drawbar **77** is pushed or pulled or swung to one side or the other, the resiliency of the rubber block **82** gripping the drawbar head **78** biases the drawbar to its illustrated central position after it is swung away therefrom, also resiliently cushions any forward or backward sliding movement of the drawbar when it is pushed or pulled, and further biases the split parts thereof together, as will be understood.

I do not wish to be restricted to the specific structural details or arrangement of parts set forth herein, as various modifications thereof may be effected without departing from the spirit and scope of my invention. I desire, therefore, that only such limitations shall be imposed thereon as are indicated in the appended claims.

I claim as my invention:

1. A draft gear having a frame, a drawbar movably disposed therein for bodily movement, said drawbar being longitudinally split, the split parts being pivotally related to provide joint spreading movement thereof laterally with respect to said bodily movement, and a single resilient structure supported at its ends in said frame and having an intermediate portion adapted to engage a portion of said drawbar for restraining both of said movements.

2. A draft gear having a frame, a drawbar movably disposed therein and having a substantially vertical projection projecting above the main horizontal plane of the drawbar with opposite flattened portions, and elliptical spring means mounted in said frame and having its opposite leaves extending in the same general direction as said flattened portions and engaging only the edges thereof.

3. A draft gear having a frame, a drawbar movably disposed therein for longitudinal movement, said drawbar being longitudinally split, the split parts being pivotally related, and elliptical spring means supported at its ends in said frame and having its opposite leaves enclosing and engaging certain portions of said split parts for biasing said parts together and also yieldingly restraining longitudinal movement of the drawbar in either a pushing or a pulling direction.

4. A draft gear having a frame, a drawbar movably disposed therein for both longitudinal and swinging movements, said drawbar being longitudinally split, the split parts being pivotally related, and elliptical spring means supported at its ends in said frame and having its opposite leaves enclosing and engaging certain portions of said split parts for centering said drawbar, in addition biasing said parts together and also yieldingly restraining a longitudinal movement of said drawbar.

5. A draft gear having a frame, a drawbar movably disposed therein for both longitudinal and swinging movements, said drawbar being longitudinally split, the split parts being pivotally related, and elliptical spring means supported at its ends in said frame and having its opposite leaves enclosing and engaging certain portions of said split parts for centering said drawbar after a swinging movement thereof, in addition biasing said parts together and also yieldingly restraining the longitudinal movement of said drawbar in either a pushing or a pulling direction.

CARL C. AUEL.