No. 862,727. PATENTED AUG. 6, 1907.

G. H. FORSYTH.

DRAW BAR MECHANISM.

APPLICATION FILED APR. 20, 1903.

5 SHEETS—SHEET 1.

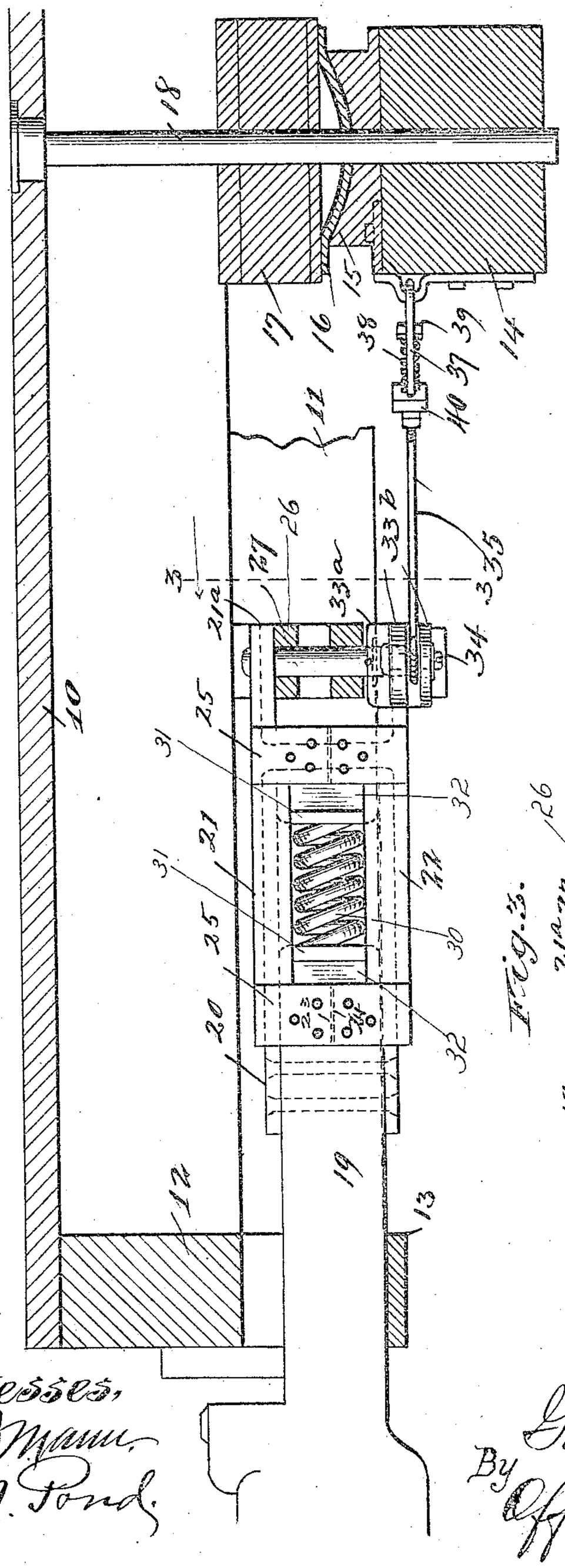

Fig. 1.

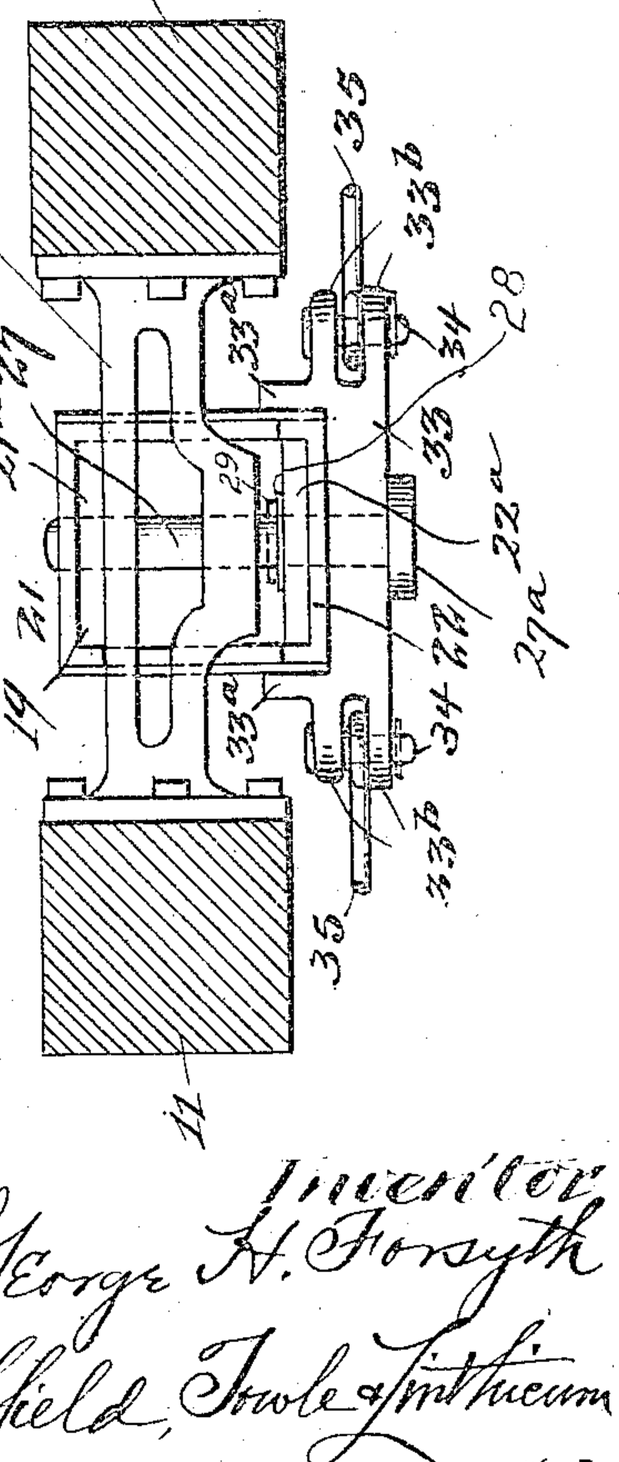

Fig. 2.

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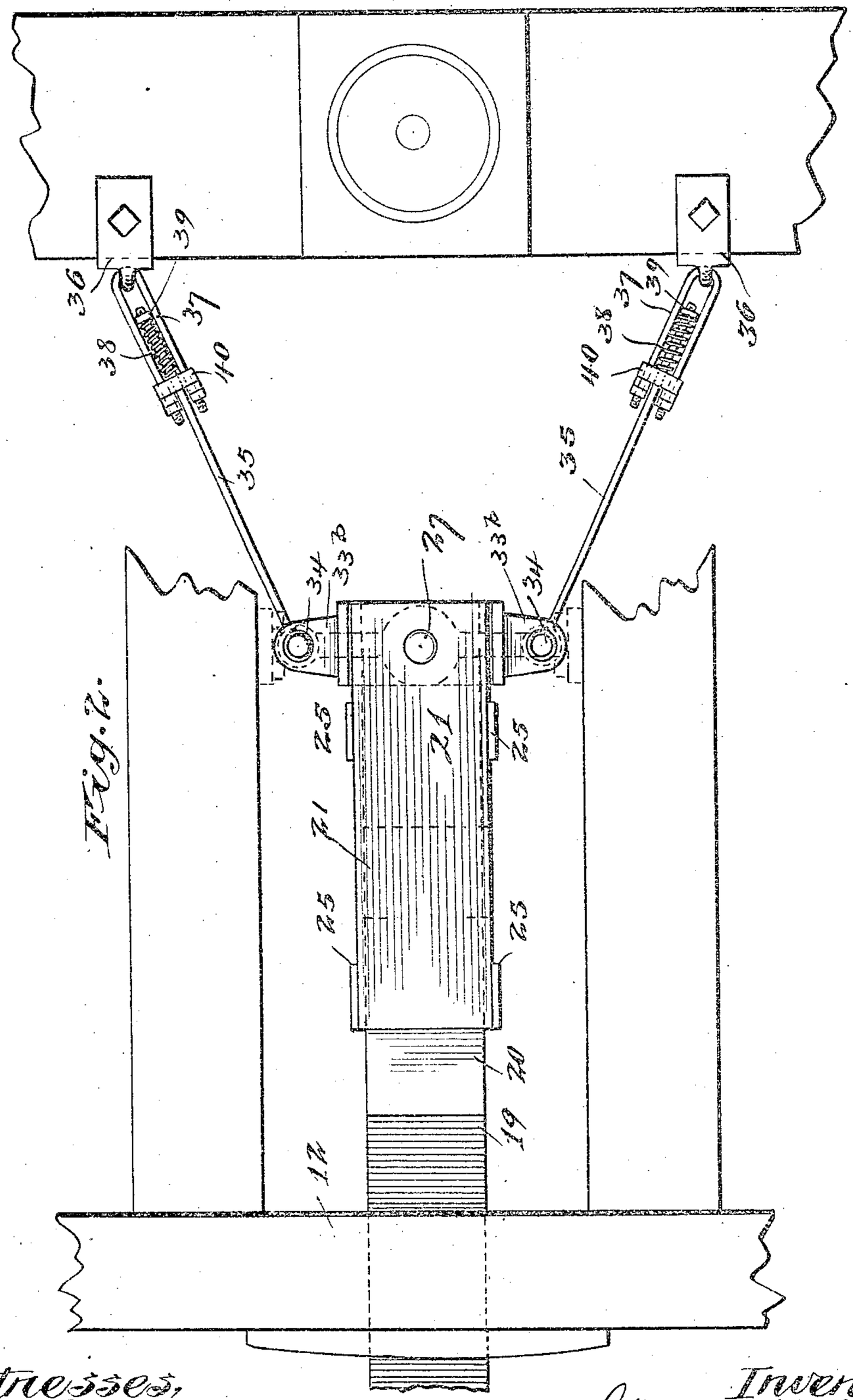

Fig. 2.

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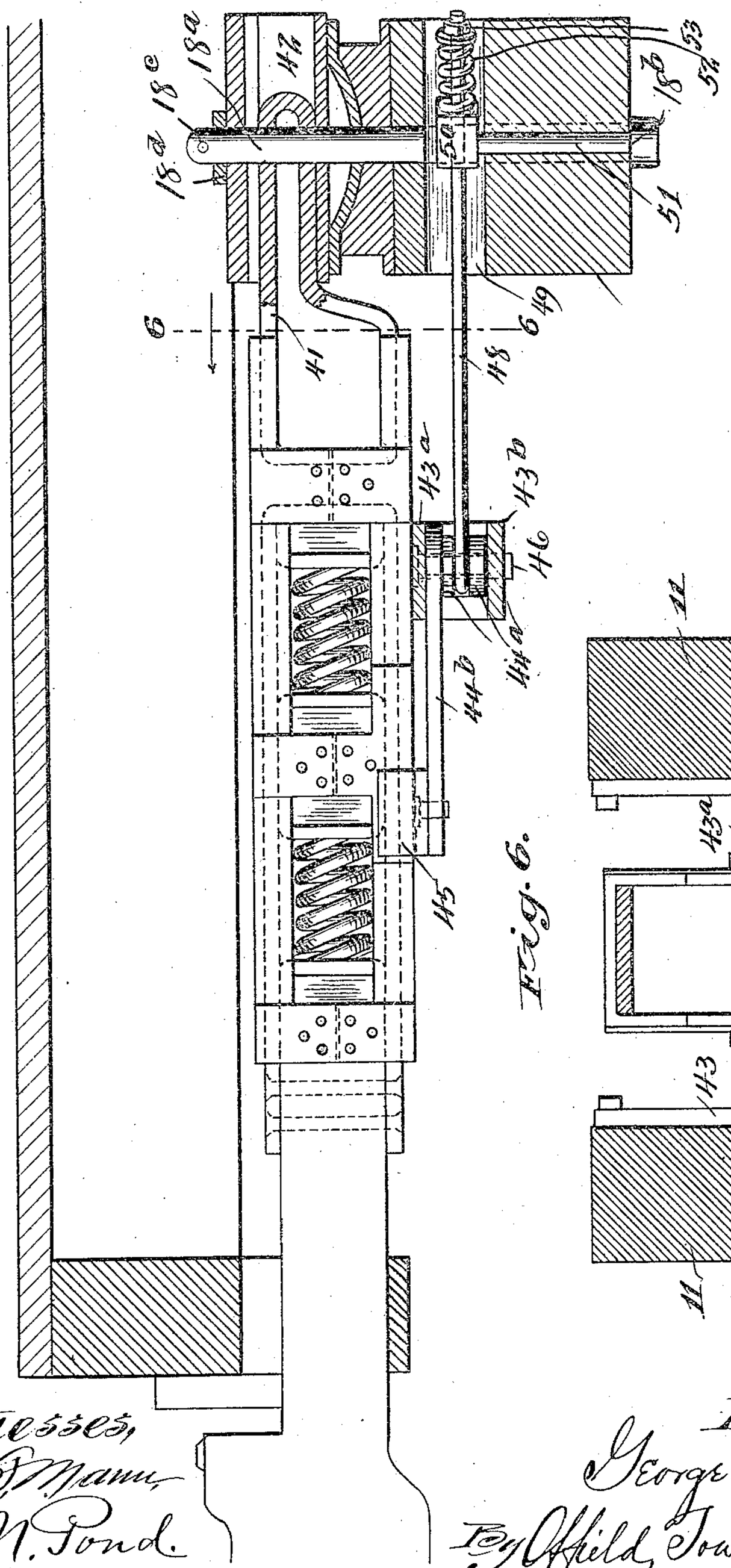

Fig. 4.

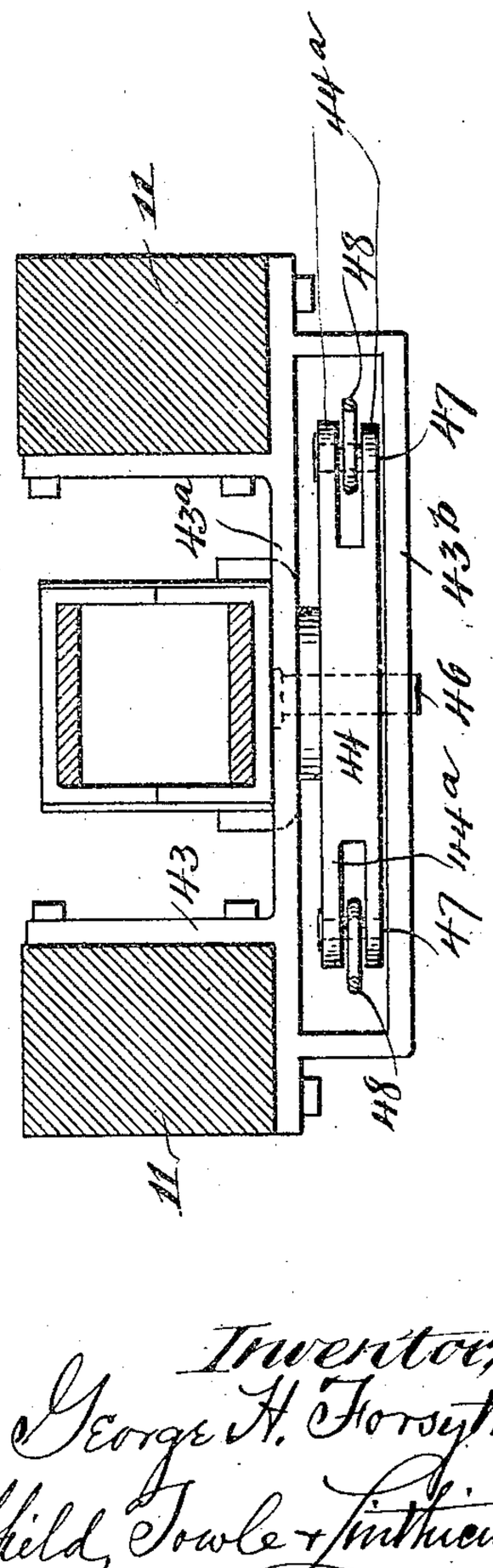

Fig. 6.

Witnesses,
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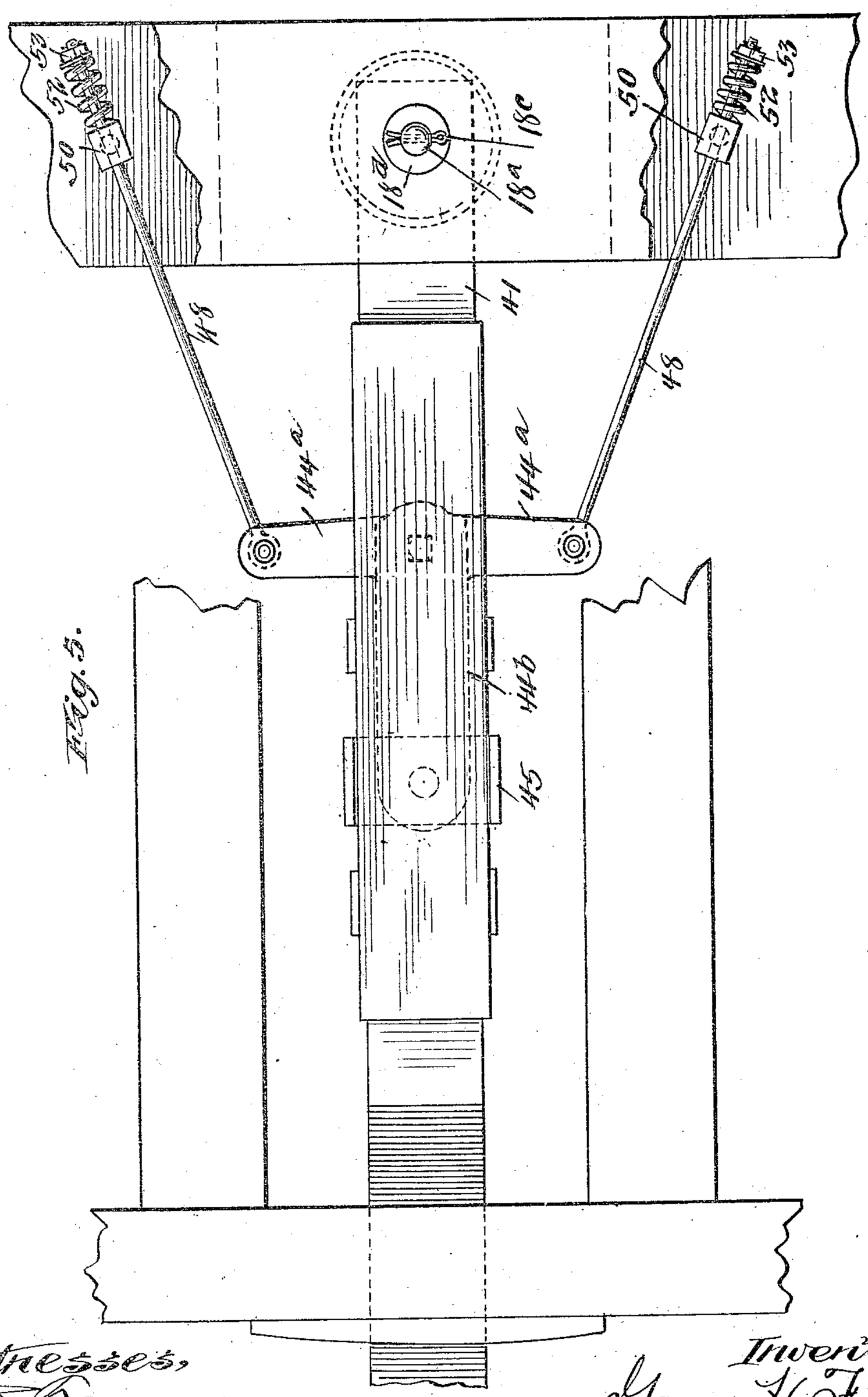
5 SHEETS—SHEET 4.



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5 SHEETS—SHEET 5.

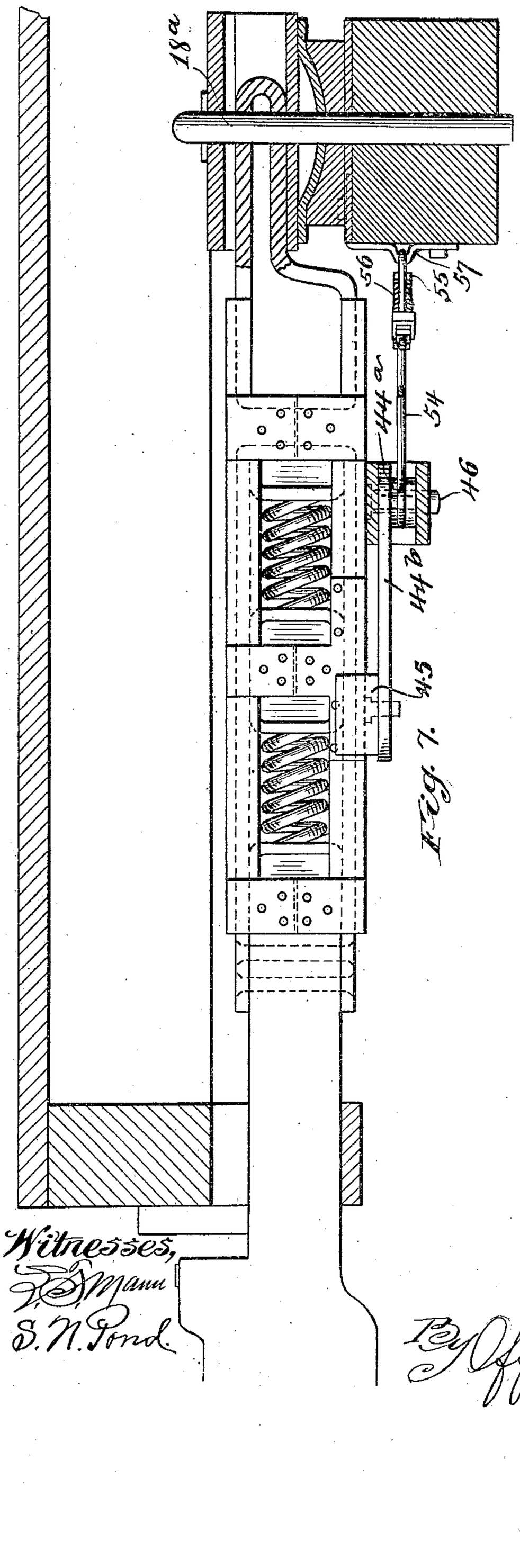

Fig. 7.

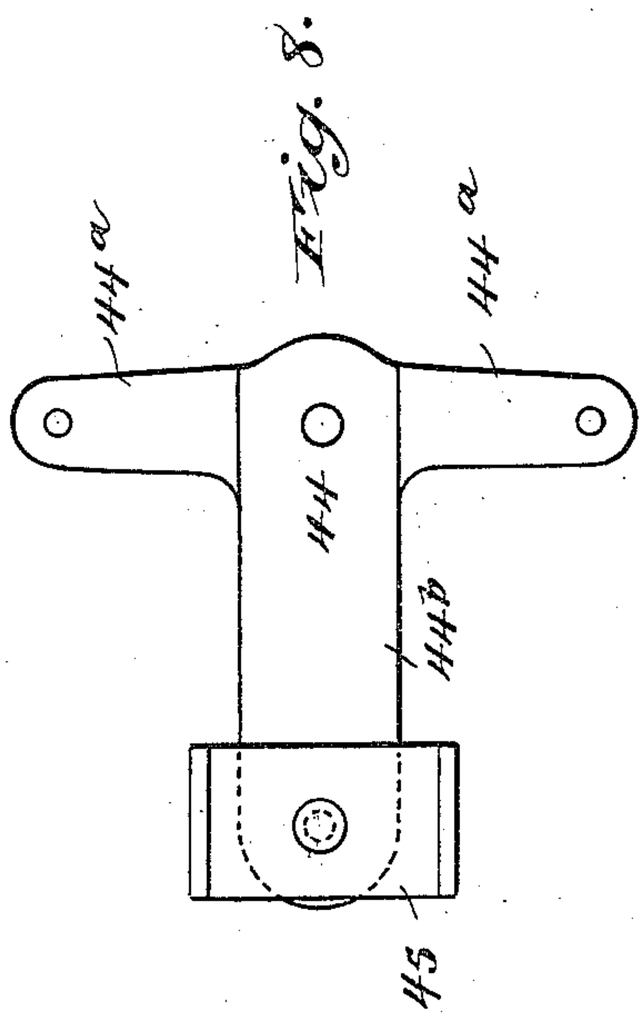

Fig. 8.

Witnesses,
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UNITED STATES PATENT OFFICE.

GEORGE H. FORSYTH, OF CHICAGO, ILLINOIS.

DRAW-BAR MECHANISM.

No. 862,727. Specification of Letters Patent. Patented Aug. 6, 1907.

Application filed April 20, 1903. Serial No. 153,540.

To all whom it may concern:

Be it known that I, GEORGE H. FORSYTH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Draw-Bar Mechanism, of which the following is a specification.

My invention relates to that class of railway appliances which relate to the draft rigging of railway cars, and more particularly such as have to do with the centering of the draw-bar mechanism.

The older forms of draw-bar centering devices consisted essentially of springs located on opposite sides of the draw-bar and operating, when the latter was deflected to one side or the other under the strains of draft, to automatically return the draw-bar to its central or otherwise normal position. More recent devices of this nature have taken the general form of a draw-bar pivotally connected to the car at a point coincident or substantially coincident with the longitudinal axis of the king-bolt, said bar being provided with rod connections from its opposite sides to the truck-bolster on opposite sides of the king-bolt, whereby the angular movement of the truck-bolster relatively to the car-body in passing around curves transmitted a corresponding angular swing of the draw-bar relatively to the central median line of the car-body, automatically maintaining the draw-bar thus at right-angles to the truck-bolster, this latter being a more favorable position for coupling purposes than that wherein the draw-bar is always maintained coincident with the longitudinal median line of the car. The last described improvement however falls short of the most effective arrangement wherein the draw-bars of adjacent and uncoupled cars would be automatically maintained substantially coincident with the line of draft on all kinds and character of track; and in a pair of companion applications filed concurrently herewith, Serial Nos. 153,537 and 153,538, I have shown, described and claimed means for effecting the last described result, such means embodying as its underlying principle of operation the imparting to the draw-bar of a lateral swing from the angular movement of the truck-bolster relatively to the car-body through connections which makes such angular swing of the draw-bar greater in amount than the angular movement of the truck-bolster, such angular swing being proportional to the differences in degrees of curvature of the track; and the essential elements of such preferred means are disclosed as consisting of a pair of pulleys or sprocket-wheels of unequal sizes, the larger being rigidly connected to the truck-frame and the smaller to the car-body in advance of the truck-frame and a flexible conneetion between said pulleys, whereby a given angular movement of the larger pulley produces a larger angular movement of the smaller pulley and consequently of the draw-bar connected to the latter, and such excess being proportional to the degrees of curvature of the track. While it is a desirable feature of such a mechanism to thus make the angular lead of the draw-bar over the truck-bolster proportional to varying degrees of curvature in the track in maintaining the draw-bar coincident with the line of draft, yet in practice it is not essential to the securing of satisfactory results that such exactness in the movements of the draw-bar be maintained; and I have found that the mechanism disclosed in the companion applications aforesaid may be considerably modified and simplified by the substitution of other draw-bar centering means which, while not yielding the same exact results nevertheless serve to maintain the draw-bar more nearly in a line coincident with the line of draft than where the draw-bar is maintained at right-angles to the truck-bolster. One form of such draw-bar centering mechanism which may be substituted for the double pulley construction disclosed in the companion applications hereinabove referred to with satisfactory results consists of a flexible connection passed around the smaller pulley which is pivoted to the car-body in advance of the king-bolt, such flexible connection being connected at its ends to an element of the truck-frame on opposite sides of the king-bolt; and such a mechanism constitutes the subject-matter of a third application Serial No. 153,539 filed concurrently herewith.

The subject-matter of my present invention relates to still another mechanism for effecting the lateral swing of the draw-bar to a position favorable for coupling, that is through an angular movement exceeding the angular movement of the truck-bolster, such mechanism having as its distinguishing characteristics the provision of a lever pivotally mounted on the under side of the car-body and imparting its angular movement to the draw-bar in association with actuating connections from the truck-frame pivotally connected to said lever.

Referring to the accompanying drawings,—Figure 1 represents a side elevation of a draft rigging and draw-bar centering device constructed in accordance with my invention; Fig. 2 is a top plan view thereof; Fig. 3 is a transverse vertical section on the line 3—3 of Fig. 1 looking in the direction of the arrow; Figs. 4, 5 and 6 are views corresponding to Figs. 1, 2 and 3, respectively, illustrating a modification in the pivotal position of the draw-bar and in certain features of the means for transmitting the angular movement of the truck-bolster to the draw-bar; Fig. 7 is a view similar to Fig. 4, but illustrating a different connection of the draw-bar actuating rods or links to the truck-bolster; and Fig. 8 is a detail top plan view of the double bell-crank lever which is connected to the truck-bolster and carries the saddle or guide for the draw-bar.

Referring first to the principal form of the invention

showing in Figs. 1, 2 and 3, 10 designates the bottom or floor of the end portion of a railway car, and 11 the draft-timbers or beams; 12 the end sill, pendent from which latter is the usual carry-iron 13. 14 designates the truck-bolster, 15 the bottom center-plate mounted therein, 16 the top center-plate, 17 the body-bolster, and 18 the king-bolt passing through said parts and pivotally connecting the center-plates. 19 designates the draw-bar, having extending inwardly from its rear end the usual strap or yoke 20. This yoke is surrounded and incased by a casing formed by a pair of oppositely-disposed channel-beams 21 and 22, the opposite side walls of which are cut out leaving the opposite ends of said beams inwardly extending and meeting tongues 23 and 24, respectively, to the outer faces of which are bolted transverse tie-plates 25. The rear ends of the channel-beams are continued rearwardly in the form of upper and lower extensions 21^a and 22^a, respectively, which embrace the upper and lower faces of a support 26 rigidly bolted to and extending between the draft-timbers or beams 11, the upper extension 21^a resting directly upon the top face of said support, and being pivotally secured thereto by means of a round bolt 27 passed from beneath through registering holes in said extension members and support, said bolt having on its lower end an enlarged head 27^a and being retained in place by any suitable means, as, for instance, by a collar or washer 28 and a cotter-pin 29.

30 designates the draft and buffing spring located within the yoke, and at its opposite ends abutting a pair of what I term follower-shells 31, these latter being simply castings or short sections of channel-iron cut to a suitable length to fit between the abbreviated side flanges of the channel-beams constituting the members of the casing, and 32 designates a pair of follower-blocks which are capable of being inserted laterally of the casing into operative position within the shells, the ends of said follower-blocks abutting the inner edges of the tie-plates 25 and the inwardly-extending tongues or flanges of the channel-beams to which said tie-plates are secured. The last described mechanism is not claimed herein, but constitutes in part the subject-matter claimed in a companion application filed concurrently herewith, Serial No. 153,537.

Referring now to the mechanism for automatically positioning the draw-bar, 33 designates a rocking-lever, here shown as a plate pivotally mounted at its center on the lower end of the pivot-bolt 27 and resting upon the enlarged head of the latter. The upper surface of this plate is provided near its ends with upstanding walls or flanges 33^a, thereby creating a draw-bar guide in the form of a saddle in which is seated the rear end of the draw-bar casing. The extremities of the plate 33 are provided with integral twin lugs or ears 33^b centrally apertured to receive short bolts 34. Pivotally connected to said bolts between the respective pairs of lugs 34 are the outer ends of a pair of rods 35, which latter at their inner ends are yieldingly and elastically connected with staples 36 on the truck-bolster through the interposition of U-bolts 37 and springs 38 confined between nuts 39 on the ends of the rods 35 and apertured bridge-pieces 40 connecting and closing the upper ends of the U-bolts. It will be observed that the staples 36 are connected to the bolster at a considerably greater distance apart than the distance between the pivot-bolts 34, as a result of which construction a given angular movement of the truck-bolster relatively to the superposed body-bolster produces a somewhat greater angular swing of the rocking-plate 33 relatively to the transverse line of the car-body; and since the saddle formed on and integral with the upper face of the rocking-plate 33 snugly fits the rear end of the draw-bar casing, the angular movement of the rocking-plate obviously imparts to the draw-bar through said saddle a lateral angular movement equal to the angular movement of the rocking-plate, the extent of which movement, as above stated, is in excess of the angular movement of the truck-bolster, whereby, on passing from straight to curved track and vice versa, and on track of varying curvature, the draw-bar is carried into a position coincident or approximately coincident with the line of draft, thereby greatly facilitating the coupling operation, which is the primary object to be attained by the mechanism described.

In Figs. 4, 5 and 6 I have illustrated a modified form of the mechanism already described and which falls within the principle and spirit of my invention, and wherein the draw-bar casing, instead of being pivoted to the under side of the car-body at a point in advance of the king-bolt, is provided with an extension-piece 41, the inner end of which lies within a mortise 42 formed horizontally through the central portion of the body-bolster, and is pivotally connected to the king-bolt 18. With this construction I prefer to employ a support 43 (Fig. 6) securely bolted at its end portions to the draft-timbers 11, and having its main parallel horizontal members 43^a and 43^b lying below the under sides of the draft-timbers. Between these horizontal members of the support is seated a rocking-plate which is in the form of a double bell-crank lever designated as an entirety by 44 (Fig. 8), said bell-crank lever comprising a pair of oppositely and laterally extending arms 44^a and a forwardly-extending arm 44^b, on the outer end of which latter is centrally pivoted a saddle 45 in which rests the draw-bar casing. The bell-crank lever 44 is pivoted at a point marking the intersection of the longitudinal median lines of its arms on a bolt 46 passed through registering central apertures in the parallel horizontal members 43^a and 43^b of the support; and the outer ends of the arms 44^a are horizontally bifurcated and apertured to receive pivot-bolts 47 (Fig. 6) on which are pivoted the inner ends of rods 48, the opposite ends of which enter horizontal mortises 49 formed through the truck-bolster on opposite sides of the king-bolt, and are passed through bearing-blocks 50 mounted on or constituting heads of vertical pins or bolts 51 rotatably mounted in the truck-bolster beneath the mortises 49, said pins 51 being located in the common longitudinal median line of the bolster with the king-bolt. The ends of the rods 48 project beyond the bearing-blocks 50 and are encircled by coil-springs 52 confined between nuts 53 on the ends of the rods and the opposite faces of the bearing-blocks 50. It will be observed that in connection with this form of my invention I have illustrated the king-bolt, designated by 18^a, as insertible through the elements which it unites from the under side of the truck-bolster, the lower end of said king-bolt having a head 18^b and its upper end being perforated for the reception of a cotter-pin 18^c, the projecting ends of which rest upon a collar or washer 18^d, surrounding the upper projecting

end of said king-bolt. A king-bolt thus insertible otherwise than from above and through the floor of the car possesses distinct advantages, especially in respect to the ease and facility with which it may be removed and replaced by a new bolt when required without requiring the removal of the truck from the car-body or the separation of the parts united by said bolt.

The operation of the mechanism last described is substantially the same as that already described in connection with the principal form of the invention shown in Figs. 1, 2 and 3. The angular movement of the truck-bolster, through the described connections, causes the double bell-crank lever 44 to swing about its axis imparting to the several arms thereof an angular travel considerably in excess of the angular travel of the bolster; and through the arm 44^b and saddle 45, imparting a reduced angular travel of the draw-bar itself, which travel of the latter, by a proper relative adjustment of the operating parts, may be made to exceed the angular movement of the truck-bolster so as to bring about the result above stated as the object of the invention.

In connection with the last described form of the invention, instead of connecting the rods 48 to the bolster by means of the swivel-blocks 50 or equivalent devices located in the longitudinal median line of the bolster, I may employ connections similar to those shown and described in connection with Figs. 1, 2 and 3, as illustrated in Fig. 7, wherein 54 designates the rods at their outer end portions connected with U-bolts 55 through interposed springs 56, which U-bolts engage staples 57 on the front face of the bolster. The last described connection is easier and cheaper to make, but the connection shown in Figs. 4 and 5 permits a greater angular movement of the parts without undue cramping of the springs constituting the elastic or yielding portions of the rod connections, and hence the latter construction gives better results on sharp curves.

I claim:

1. The combination with a car-body, a truck-frame and a draw-bar pivotally connected to said car-body, of a draw-bar guide pivotally mounted on the car-body in advance of the king-bolt, and connections pivoted to said guide and extending to and connected with an element of the truck-frame for actuating said guide from the angular movement of the truck-frame relatively to the car-body, substantially as described.

2. The combination with a car-body, a truck-frame and a draw-bar pivotally connected to said car-body, of a draw-bar guide pivotally mounted on the car-body in advance of the king-bolt, and extensible connections pivoted to said guide and extending to and connected with an element of the truck-frame for actuating said guide from the angular movement of the truck-frame relatively to the car-body, substantially as described.

3. The combination with a car-body, a truck-frame and a draw-bar pivotally connected to said car-body, of a rocking lever pivotally mounted on the car-body in advance of the king-bolt, connections between the ends of said rocking lever and an element of the truck-frame on opposite sides of the king-bolt, respectively, and connections between said rocking lever and the draw-bar for imparting to the latter a lateral angular movement from the angular movement of the truck-frame relatively to the car-body, substantially as described.

4. The combination with a car-body, a truck-frame and a draw-bar pivotally connected to said car-body, of a rocking lever pivotally mounted on the car-body in advance of the king-bolt, extensible connections between the ends of said rocking lever and an element of the truck-frame on opposite sides of the king-bolt, respectively, and connections between said rocking lever and the draw-bar for imparting to the latter a lateral angular movement from the angular movement of the truck-frame relatively to the car-body, substantially as described.

5. The combination with a car-body, a truck-frame and a draw-bar pivotally connected to said car-body in advance of the king-bolt, of a pivoted draw-bar guide whose pivotal axis is substantially that of the draw-bar, and connections pivoted to said guide and extending to and connected with an element of the truck-frame, substantially as described.

6. The combination with a car-body, a truck-frame and a draw-bar pivotally connected to said car-body in advance of the king-bolt, of a rocking lever whose pivotal axis is substantially coincident with that of the draw-bar, connections between the ends of said rocking lever and an element of the truck-frame on opposite sides of the king-bolt, respectively, and connections between said rocking lever and the draw-bar for imparting to the latter a lateral angular movement from the angular movement of the truck-frame relatively to the car-body, substantially as described.

7. The combination with a car-body, a truck-frame and a draw-bar pivotally connected to said car-body in advance of the king-bolt, of a rocking lever whose pivotal axis is substantially coincident with that of the draw-bar, connections pivoted to said lever and extending to and connected with an element of the truck-frame, and connections between said rocking lever and the draw-bar for actuating the latter, substantially as described.

8. The combination with a car-body, a truck-frame and a draw-bar pivotally connected to said car-body, of a rocking plate pivotally mounted on the car-body in advance of the king-bolt, pivoted extensible rod connections between the ends of said rocking plate and an element of the truck-frame on opposite sides of the king-bolt, respectively, and connections between said rocking plate and the draw-bar for imparting to the latter a lateral angular movement from the angular movement of the truck-frame relatively to the car-body, substantially as described.

9. The combination with a car-body, a truck-frame and a draw-bar pivotally connected to said car-body in advance of the king-bolt, of a rocking plate pivotally mounted on the pivotal axis of the draw-bar, pivoted extensible rod connections between the ends of said rocking plate and an element of the truck-frame on opposite sides of the king-bolt, respectively, and connections between said rocking plate and the draw-bar for imparting to the latter a lateral angular movement from the angular movement of the truck-frame relatively to the car-body in passing around curves, substantially as described.

10. The combination with a car-body, a truck-frame and a draw-bar pivotally connected to said car-body in advance of the king-bolt, of a rocking plate pivotally mounted on the pivotal axis of the draw-bar, extensible elastic connections between the ends of said rocking plate and the truck-bolster on opposite sides of the king-bolt, respectively, and a saddle formed rigid with said rocking plate, seating the draw-bar and transmitting to the latter the angular movement of the rocking plate, substantially as described.

11. The combination with a car-body, a truck-frame and a draw-bar pivotally connected to said car-body, of a draw-bar guide pivotally mounted on the car-body in advance of the king-bolt, and connections pivoted to said guide and extending to and connected with the truck-bolster for actuating said guide from the angular movement of the truck-bolster relatively to the car-body, substantially as described.

12. The combination with a car body and a truck frame, of a draft rigging capable of angular movement, a draw-bar connected to said draft rigging, and connections from said draft rigging to the truck bolster adapted to impart to the draw-bar a greater angular movement relatively to the car body than occurs between the latter and the truck, substantially as described.

13. The combination with a car-body and a truck-frame, of a draft rigging capable of angular movement, a longitudinally-movable draw-bar connected to said draft rigging, and connections from said draft rigging to the truck-

bolster adapted to impart to the draw-bar a greater angular movement relatively to the car-body than occurs between the latter and the truck, substantially as described.

14. The combination with a car body and a truck frame, of a draft rigging pivoted in advance of the pivotal center between the truck and car body, a draw-bar connected to said draft rigging, and connections from said draft rigging to the truck bolster adapted to impart to the draw-bar a greater angular movement relatively to the car body than occurs between the latter and the truck, substantially as described.

15. The combination with a car-body and a truck-frame, of a draft rigging pivoted in advance of the pivotal center between the truck and car-body, a longitudinally-movable draw-bar connected to said draft rigging, and connections from said draft rigging to the truck bolster adapted to impart to the draw-bar a greater angular movement relatively to the car-body than occurs between the latter and the truck, substantially as described.

16. The combination with a car body and a truck frame, of a draft rigging capable of angular movement, and extensionable connections therefrom to the truck bolster adapted to impart to the draw-bar a greater angular movement relatively to the car body than occurs between the latter and the truck, substantially as described.

17. A draft rigging mounted on a car and adapted to swing laterally, and means connecting the same indirectly with the truck and adapted to transmit to the draft rigging from the turning of the truck, a greater motion than would be transmitted to it by a direct connection with the truck, substantially as described.

18. A draft rigging mounted on a car and adapted to swing laterally, and means connecting the same with the truck and adapted to transmit motion of increased extent to the draft rigging from the turning of the truck, said means comprising a lever connected to the draft rigging and to the car frame and connected also to the truck, substantially as described.

19. A draft rigging mounted on a car and adapted to swing laterally, and means connecting the same with the truck and adapted to transmit to the draft rigging from the turning of the truck, a greater motion than would be transmitted to it by a direct connection with the truck, said connecting means being yielding and adapted to permit the coupled draft riggings of adjacent cars when on a curve to assume a straight line between their respective centers of motion, substantially as described.

20. In combination with a car, a frame adapted to swing laterally and to carry a draw-bar and resistance attachments, and means connecting the same with the truck and adapted to transmit to the frame from the turning of the truck a greater motion than would be transmitted to it by a direct connection with the truck, substantially as described.

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