No. 765,964. PATENTED JULY 26, 1904.

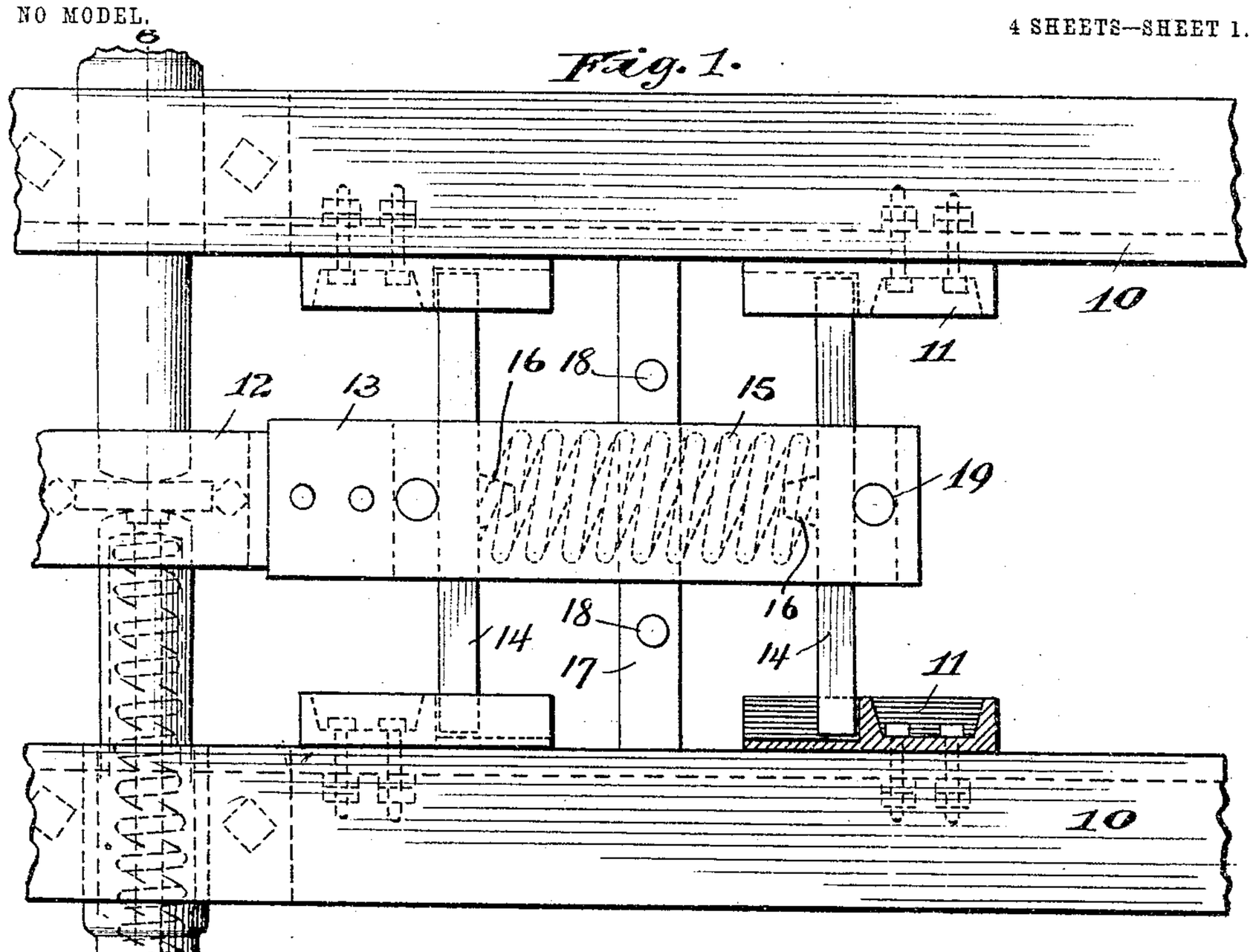
G. H. FORSYTH.

DRAFT RIGGING MECHANISM.

APPLICATION FILED OCT. 2, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.



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NO MODEL. 4 SHEETS—SHEET 2.

Fig. 3.

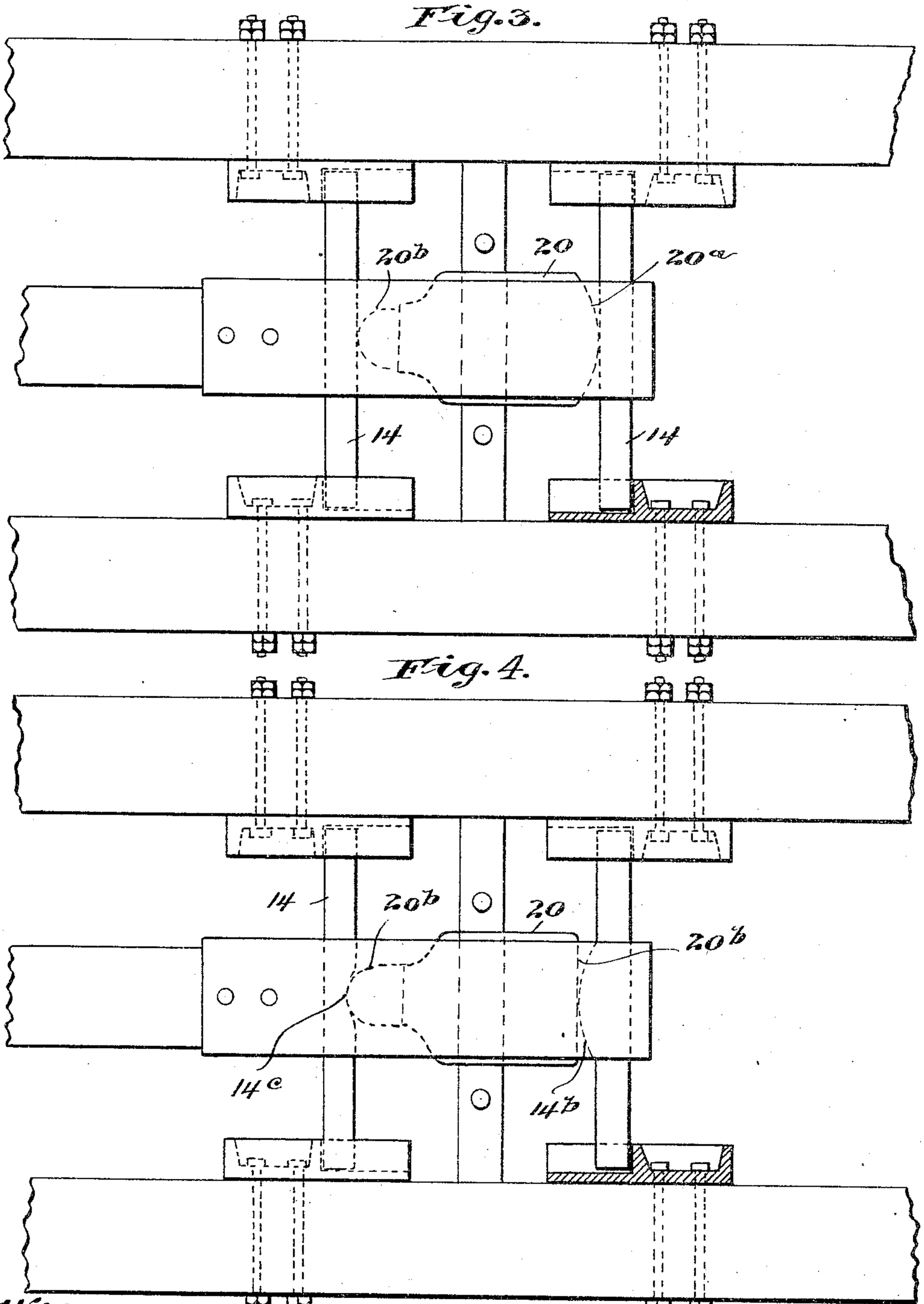

Fig. 4.

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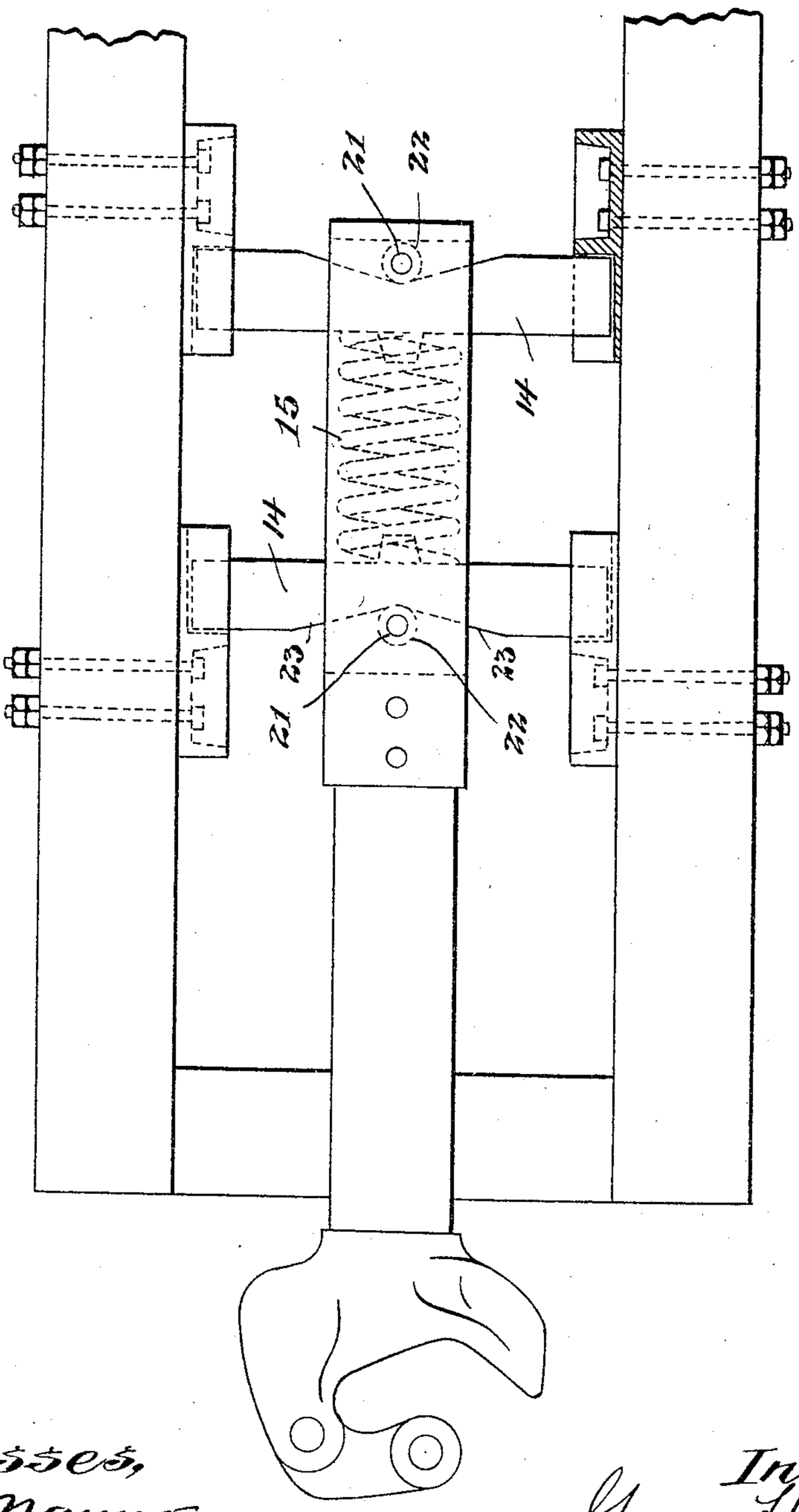
NO MODEL. 4 SHEETS—SHEET 3.

Fig. 5.



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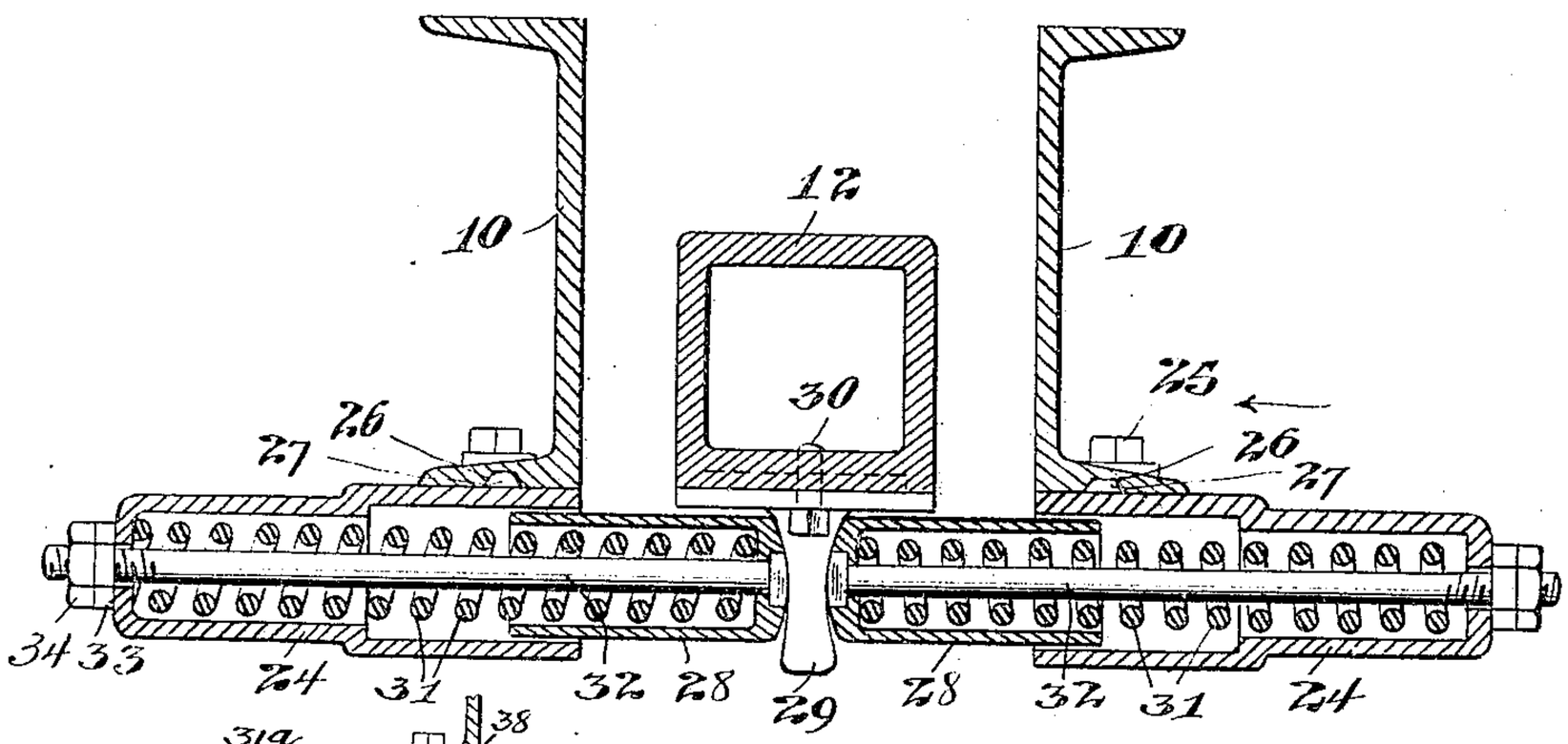
NO MODEL. 4 SHEETS—SHEET 4

Fig. 6.



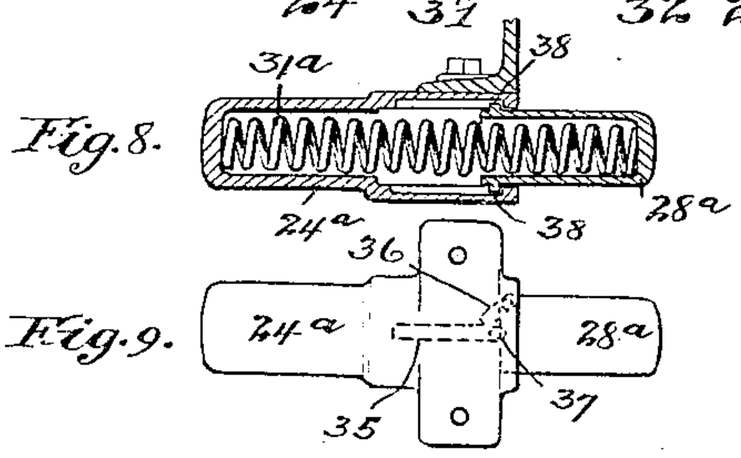


Fig. 8.

Fig. 9.

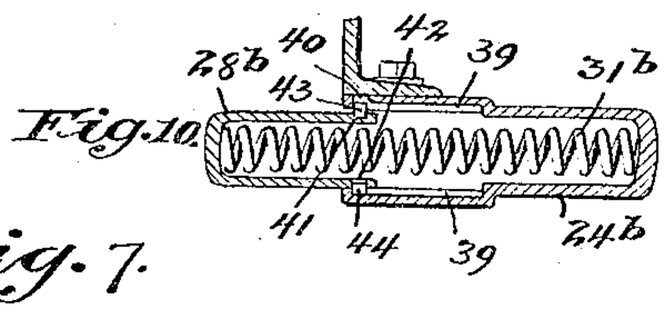


Fig. 10.

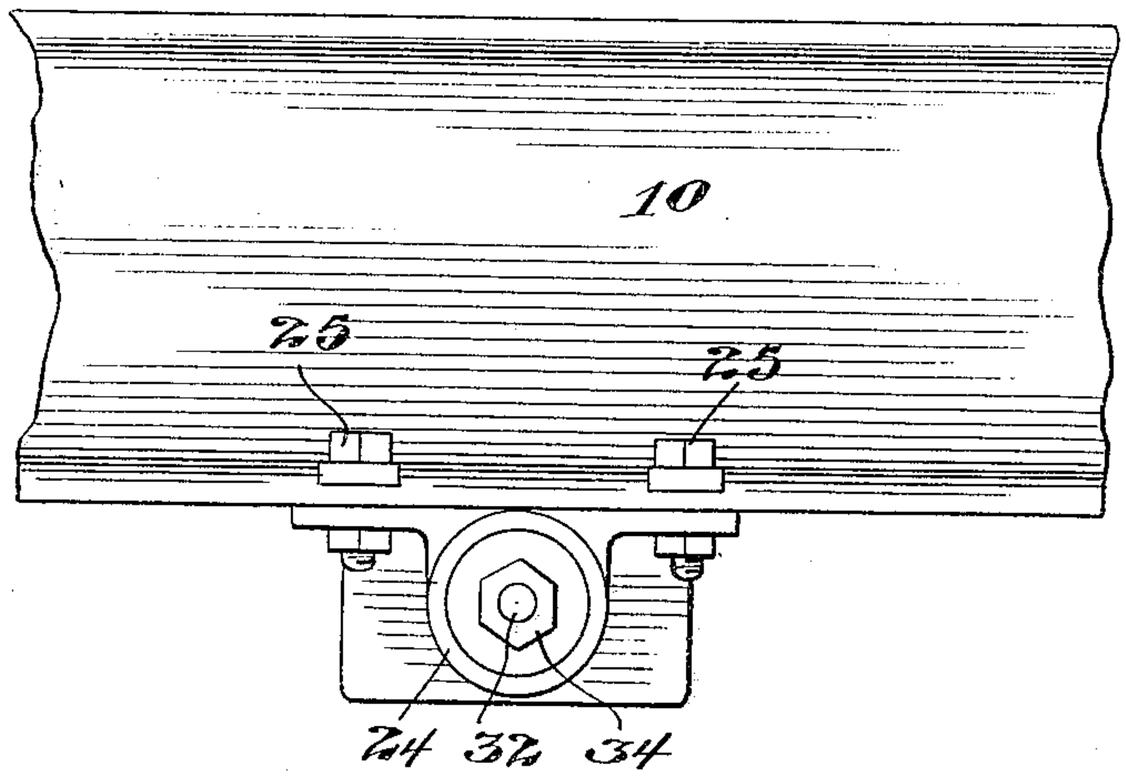


Fig. 7.

Witnesses.

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No. 765,964. Patented July 26, 1904.

UNITED STATES PATENT OFFICE.

GEORGE H. FORSYTH, OF CHICAGO, ILLINOIS.

DRAFT-RIGGING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 765,964, dated July 26, 1904.

Application filed October 2, 1903. Serial No. 175,409. (No model.)

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 Draft-Rigging Mechanism, of which the following is a specification.

My invention relates to draft-rigging mechanism for railway-cars, and has for its principal object to improve the action of the draft and buffing strains upon the resistance medium. Draft-rigging mechanisms at present employed possess for the most part, so far as I am aware, an inherent fault, which resides in a tendency to an uneven compression or cramping of one side of the spring or other resistance medium when the draft or buffing strains are transmitted through the draw-bar in an off-center position. To illustrate, where a coil-spring is employed as the resistance medium, as is extensively done in practice, the ends of the spring are made to squarely abut the inner surfaces of the follower, and these latter in turn squarely abut against the inner vertical member of the yoke-strap and the inner end of the draw-bar, respectively, and the result is that when the draw-bar is swung to one side of normal or central position the angular relation thus established between the draw-bar and that one of the followers through which the strain is transmitted and the spring results in the application of the draft or buffing strain at a point coincident with the lateral boundary or edge of the spring, thus unduly cramping the coils on that side or edge and producing an uneven and partially buckled condition of the spring. This fault it is the object of the present invention to eliminate; and this object I may accomplish through a considerable variety of constructions, all of which are characterized, however, by the fact that the draft and buffing strains are imparted to the resistance medium not only at a point lying on the longitudinal axis of the latter when the draw-bar is in central or normal position, but also at a point which is coincident or substantially coincident with some point in the longitudinal axis of the resistance medium when the draw-bar is swung to either side of its normal or central position.

My invention also contemplates the employment in connection with such a draft-rigging of means for normally maintaining the draw-bar in central or normal position. In one form of my invention such centering means inheres in and constitutes a part of the draft-rigging mechanism through which the principal object of my invention is carried out. In another form the centering means is independent of the particular construction of draft-rigging and is capable of general application to constructions wherein the draw-bar is located wholly or partially between the draft timbers or sills of the car.

Referring to the drawings which illustrate the preferred embodiments of the several features of my invention, Figure 1 is a top plan view, with one of the follower-stops in horizontal section, of a draft-rigging embodying my improvements in one form. Fig. 2 is a similar view illustrating the principle of the invention in a modified form. Fig. 3 is a similar view, also illustrating the principle of the invention as aplied to a construction employing one of the well-known friction resistance mediums. Fig. 4 is a similar view illustrating a slight modification of the form of the invention shown in Fig. 3. Fig. 5 is a similar view illustrating the principle of the invention as embodied in a form wherein an automatic centering effect is obtained. Fig. 6 is a transverse sectional view on the line 6 6 of Fig. 1. Fig. 7 is a detail side elevational view of the parts shown in Fig. 6 looking in the direction indicated by the arrow, and Figs. 8 to 10 are detail views illustrating modified means for interlocking the telescoping members of the centering device shown in Figs. 6 and 7 in lieu of the means shown in the latter figures.

Referring to the drawings, 10 designates the center sills of a car construction, herein shown in the form of oppositely-facing channels, although it is to be understood that the said parts may within the invention represent draft-beams secured to the under side of the center sills and may have the form of ordinary wooden timbers or other beams, if desired. To the opposite inner faces of the beams 10 are secured the usual stop-blocks 11.

12 designates the draw-bar, to the inner end of which is attached the usual yoke-strap 13, while 14 designates the followers, lying within and transversely of the yoke and at their ends abutting stops 11, as usual.

15 designates the resistance medium in the form of the usual coil-spring, the opposite ends of which abut the inner faces of the followers and are preferably entered by lugs 16 on the latter.

17 designates a bar extending transversely of and beneath the sills 10 and directly underlying the yoke 13 and provided on its upper face with lugs 18, constituting stops to limit the excessive bodily lateral displacement of the draw-bar and its yoke when drawn to one side, as in passing around a curve.

In such draft-rigging mechanisms as heretofore employed the outer faces of the followers have squarely contacted the vertical end member of the yoke and the vertical inner face of the draw-bar, respectively, the result of which construction has been that the follower has had a tendency to partake of the angular movement of the yoke and has thus brought the point of application of the draft or buffing strain upon the edge of the spring, thus cramping the coils on that edge or side and tending to slightly buckle or bow the entire spring. Such a construction is dispensed with in my present improvement, being substituted by a variety of constructions all having as their common principle of operation the application of the draft or buffing strain through the follower at a point which is coincident or substantially coincident with a point in the longitudinal axis of the resistance medium and which affords a rocking or pivotal movement either between the yoke and the follower or between the follower and the resistance medium, thus not requiring the follower to partake of the angular movement of the yoke when swung to one side of normal position or where such is the case applying the force from the follower to the resistance medium through a contacting point which lies coincident or substantially coincident with a point in the longitudinal axis of the resistance medium. This novel effect is secured in the form of the invention illustrated in Fig. 1 by means of a pin or bolt 19, extending through and between the upper and lower sections of the yoke-strap at each end thereof and laterally central thereof and having a rolling or rocking bearing upon the outer faces of the followers 14 at points which lie in the line of the longitudinal axis of the spring 15. Under a draft or buffing strain imparted when the draw-bar is swung to one side there is a slight rocking of that one of the bolts 19 through which the strain is imparted upon the outer face of the follower; but this rocking is so slight that the point of application of the force still remains substantially in the axis of the resistance medium, and thus tends to effect a uniform and even compression of the coils of the latter.

In Fig. 2 the same idea with similar beneficial results is carried out through a construction wherein the outer faces of the followers 14 are provided with convex surfaces 14^a, having bearing contact with the inner face of the vertical wall of the yoke and with the inner face of the inner end of the draw-bar, respectively. The actual point of contact between these surfaces when the draw-bar is in central or normal position exactly coincides with a point in the longitudinal axis of the resistance medium; but when the draw-bar is swung to one side or the other there is a slight rocking of the straight surface of the yoke or end wall of the draw-bar upon the convex surface of the follower engaged thereby such as carries the point of contact slightly to one side or the other of the longitudinal axis of the resistance medium, but still maintains such point of contact so nearly or approximately within said longitudinal axis as to fully secure the beneficial results hereinabove specified.

Fig. 3 represents an application of the same inventive idea to a construction wherein a friction draft-gear of well-known type is employed. In this case 20 indicates the outer cylinder, one end of which is rounded or convexed, as shown at 20^a, to rockingly engage the inner face of the follower 14, contacted thereby. At the opposite end of the cylinder the friction-gear is provided with a rounded or convexed member 20^b, having a longitudinal movement relatively to the shell or cylinder 20, said member being intended to similarly engage the inner face of the opposite follower 14. It will be readily seen that while in this construction the followers partake of the angular movements of the draw-bar and yoke when swung to one side or the other of normal or central position, yet their rocking relation to the parts of the resistance medium engaged thereby is such as to always maintain the point of contact through which the strain is applied approximately within the longitudinal axis of the resistance medium. It may here be noted that the necessity for the accommodating connection hereinabove described is even greater in friction draft-gear than in spring draft-gear, owing to the greater inherent accommodating capacity of the latter.

Fig. 4 illustrates a slight modification of the construction and arrangement last described and shown in Fig. 3, such modification consisting in locating the convex surface at one end on the inner face of the follower, as shown at 14^b, and the coöperating straight surface on the end of the cylinder 20, as shown at 20^b, while at the opposite end the inner face of the other follower 14 is concaved, as shown at 14^c, to form a seat for the rounded

member 20^b of the friction-gear. This latter construction provides for a pivotal or curved sliding movement between the engaging parts which forestalls any tendency to lateral displacement of that end of the friction device relatively to the follower engaged thereby. It must be evident that a correspondingly-convexed extremity might be given to the opposite end of the friction-gear, shell, or cylinder and a similar concave recess or depression in the adjacent follower.

In the construction shown in Fig. 5 the yoke-strap is provided at its opposite ends with pins or bolts, such as are shown and described in connection with Fig. 1, these pins being indicated at 21, and preferably they are surrounded by antifriction-rollers 22, rotatably mounted thereon. In this construction the outer faces of the follower-blocks, which are engaged by the said rollers, are provided each with a pair of oppositely-inclined cam-surfaces 23, which meet at a point in the longitudinal axis of the resistance medium and the obvious effect of which under the compressional effect of the spring or resistance medium 15 is to maintain the rollers 22 coincident with the meeting point of the cams, or, in other words, at the lowest or innermost points of the shallow notches created in the outer faces of the followers by the presence of the inclined or cam surfaces 23, and when the rollers 22 are thus positioned the yoke and draw-bar lie in their central or normal position. When the draw-bar is swung to one side, as in passing around a curve, that one of the rollers 22 through which the strain is imparted to the follower and spring remains in its central position relatively to the notched face of the follower, while the other roller assumes a temporary offset position within the lateral boundaries of the inclined cam of its adjacent follower. In this way the draft or buffing strain is always applied at a point within the longitudinal axis of the resistance medium and at the same time when the strain is off, as when the cars are uncoupled, the expansive effect of the resistance medium acting through the followers and their inclined surfaces upon the rollers 22 tends to automatically return and center the draw-bar. It will thus be seen that this construction not only effects the main purpose of the invention with reference to the application of the draft and buffing strains upon the resistance medium, but also automatically maintains the draw-bar and coupler-head in central or normal position when disengaged favorable for coupling purposes.

Figs. 6 and 7 illustrate a novel form of centering device capable of general application to any of the several forms of draft-rigging herein illustrated and described or to other forms wherein the draw-bar lies wholly or partially between laterally-confining members. In these views 24 represents a pair of cages which are bolted to the lower flanges of the sills or beams 10, as by the bolts 25. To secure increased strength and rigidity of the fastening, I preferably provide said flanges with apertures 26, cone-shaped at their lower ends, which are engaged by correspondingly-shaped lugs 27 on the upper surfaces of the cages. The open inner ends of the cages 24 are adapted to be internally telescoped by thrust devices in the form of thimbles 28, adapted to operate against a depending member 29, secured to the under side of the draw-bar, as by a screw-bolt 30. Within the thimbles and cages are disposed elongated coil-springs 31, which abut the closed ends of the cages and thimbles at their opposite ends, respectively, while for the purpose of limiting the inward travel of the thimbles under the thrust of the springs rods 32 may be employed lying within the springs 31, connected at one end to the ends of the thimbles and at their other ends passing through holes in the outer or closed ends of the cages and equipped with tensioning-nuts 33 and lock-nuts 34.

Figs. 8 and 9 represent modifications of the centering devices last described designed to obviate the necessity of the rods 32, at the same time preserving all the advantages of the latter and rendering the construction simpler and more economical of production and manipulation. In these views 24^a and 28^a designate the telescoping members of the device, and 31^a the spring. At opposite points in the inner surface of the members 24^a are grooved a pair of ways or guides consisting each, as best shown in dotted lines in Fig. 9, of a main longitudinal groove 35 and a short oblique groove 36, communicating at its inner end with the outer end of the main groove 35 and at its outer end with the end of the casing. The junction of the grooves 35 and 36 is characterized by the provision of a slight backset or recess 37, constituting, in effect, a seat or pocket for the reception of a pin or lug 38 on the meeting end of the companion member 28^a when the parts 24^a and 28^a are separated to the maximum desired extent by the expansion of the confined spring 31^a. In assembling the parts the spring is first introduced to the cage or housing 24^a, the thimble 28^a is passed over the opposite projecting end of the spring, the lugs 38 are brought into registration with the outer ends of the oblique grooves 36, and the parts are forced inwardly or together, whereby the lugs 38 travel in through the short inclined grooves 36, this travel effecting a partial relative rotation between the coöperating housing, and then by a slight backward movement are introduced to the main longitudinal grooves 35, in which latter they reciprocate under the normal action of the mechanism. By reason of the fact that the spring is still under slight tension when the pins 37 are at the outer extremities of the grooves 35, occupying the seats 37, there is no liability of accidental separation of the parts, while at the same time

the described construction permits the ready assembling of the parts and the initial tensioning of the spring by a mere introduction of the parts to each other and a slight relative torsion, the parts being thereafter securely interlocked against accidental displacement when in service.

Fig. 10 illustrates still another means of effecting the desirable results last described. In this construction the member 24^b is provided, as last described, with a pair of oppositely-disposed longitudinal grooves 39, the upper of which latter terminates at its outer end in an aperture 40 through the wall of the casing. The companion member 28^b is provided at its open end on its upper side with a seat or socket 41, corresponding in form and dimensions to the aperture 40, and at the opposite or lower part thereof with an aperture 42, corresponding in width with the width of the lower groove 39. 43 designates a locking block or key of a size to slip through the aperture 40 and seat itself in the seat 41, while the upper portion of the key slidingly engages the upper groove 39, and 44 designates a corresponding locking block or key which may be slipped through the lower aperture 42, the lower portion thereof slidingly engaging the lower groove 39. In assembling the parts the spring 31^b is first inserted in the housing 24^b, after which the member 28^b, with the key 44 already in place, is introduced into the open end of the housing 24^b by slidingly compressing the spring. As soon as it has been introduced sufficiently to permit the key 44 to drop and seat itself in the lower groove 39 the upper key 43 may be introduced through the aperture 40, whereupon the parts are securely interlocked. The device then being attached to the under side of the superposed sill the upper aperture 40 is entirely covered, thereby preventing any possibility of displacement or loss of the key 43, and thus insuring the interlocking of the coöperating members when in service.

The operation and advantages of the several forms of draft-rigging devices herein shown and described have already been set forth in connection with the description of their construction and organization. The centering devices last described and typically illustrated in Figs. 6 to 10, inclusive, while capable of general application, are especially useful and adaptable in freight construction where the draw-bar is wholly or partially located between the draft-sills, and it will be observed that in this construction the employment of a depending member formed on or connected to the draw-bar is of importance as allowing the centering devices to be applied to the under sides of the center sills or draft-beams, where they are out of the way of the superposed mechanism and do not interfere with the full lateral play of the draw-bar as permitted by the spacing of its confining members. It will also be observed that the described location of the centering means permits of the ready attachment and detachment thereof relatively to the car-framing, especially when the car is in service, and also obviates the necessity of aperturing the draft beams or sills, which is objectionable, because to a certain extent weakening the latter.

While I have herein shown and described a centering device as carried on the under side of the draft timbers or sills and adapted to turn the draw-bar to a central or normal position relative to the car-body, yet to the extent indicated in certain of the claims I desire to include as covered by the spirit of my invention a controlling means which serves to return the draw-bar to a coupling position on curves as well as on straight track.

It is evident that the several features of my present invention, as hereinabove described, and illustrated in the drawings, might be considerably changed and modified beyond the modifications shown and illustrated without departing from the spirit or sacrificing any of the advantages of the invention. I do not, therefore, limit the latter to the particular forms shown and described except to the extent indicated in specific claims.

I claim—

1. In a draft-rigging for railway-cars, the combination with the draft-sills, followers, follower-stops, draw-bar and resistance medium, of a connection or bearing between the draw-bar or extension thereof and resistance medium permitting of a relative angular movement between the contacting elements without substantial edgewise cramping of the resistance medium, as and for the purpose described.

2. In a draft-rigging mechanism, the combination with the draw-bar, of a member carried by or abutting against the car, said member being capable of a relative angular movement to the draw-bar or extension thereof, and means whereby when the draw-bar is thrown to one side or is in an abnormal position the buffing or draft strain transmitted through said member is applied wholly at a point substantially in the line of the axis of the resistance medium, as and for the purpose described.

3. In a draft-rigging mechanism, the combination with the draw-bar, of members carried by or abutting against the car, said members being capable of a relative angular movement to the draw-bar or extension thereof and of longitudinal movement relatively to the car and coöperating with the other members of the draft-rigging, and means whereby when the draw-bar is thrown to one side or is in an abnormal position the buffing or draft strain transmitted through said members is applied wholly at a point substantially in the line of the axis of the resistance medium, as and for the purpose described.

4. In a draft-rigging for railway-cars, the combination with the draft-sills, followers, follower-stops, draw-bar, yoke-strap and resistance medium, of rocking or pivotal bearings between the draw-bar and its yoke-strap and the followers, respectively, having an accommodating movement serving to effect the application of draft and buffing strains wholly at points substantially in the line of the axis of the resistance medium, as and for the purpose described.

5. In a draft-rigging for railway-cars, the combination with the draft-sills, a follower, a follower-stop, draw-bar and extension thereof and resistance medium, of connections or bearings between the draw-bar or its extension and an end of the resistance medium, having an accommodating movement serving to effect the application of draft or buffing strain wholly at a point substantially in the line of the axis of the resistance medium when the draw-bar is thrown to one side of normal position, as and for the purpose described.

6. In a draft-rigging for railway-cars, the combination with the draft-sills, followers, follower-stops, draw-bar, yoke-strap and resistance medium, of a rocking connection between a follower and the adjacent end of the resistance medium serving to effect the entire application of draft or buffing strains in and closely adjacent to the axis of the resistance medium, as and for the purpose described.

7. In a draft-rigging mechanism for cars, the combination with the draw-bar and a resistance medium, of members carried by or abutting against the car, said members being capable of a relative angular movement to the draw-bar or extension thereof, means whereby when the draw-bar is thrown to one side or is in an abnormal position the buffing and draft strains transmitted through said members occur wholly at a point substantially in the line of the axis of the resistance medium, and a centering or controlling means whereby the draw-bar is returned to its central or normal position, as and for the purpose described.

8. In a draft-rigging mechanism for cars, the combination with the draw-bar and a resistance medium, of members carried by or abutting against the car, said members being capable of a relative angular movement to the draw-bar or extensions thereof and of longitudinal movement relatively to the car, accommodating means whereby when the draw-bar is thrown to one side or is in an abnormal position the buffing and draft strains transmitted through said members occur at a point substantially in the line of the axis of the resistance medium, said accommodating means also operating in conjunction with the action of the resistance medium of the draft-rigging to return the draw-bar to a central or normal position, as and for the purpose described.

9. The combination with the draft sills or beams and a draw-bar located therebetween and capable of angular movement, of a centering or controlling means carried by and fastened to the under side of said draft sills or beams and tending to return the draw-bar to its normal or central position said centering or controlling means consisting of a plurality of independently-movable parts, as and for the purpose described.

10. In a draft-rigging mechanism, the combination with a draw-bar, of members carried by the car and adapted to receive the strains of buffing and draft, said members being capable of movement longitudinally of the car, and means coöperating with said members whereby there is imparted to the draw-bar a tendency to remain in its normal or central position, substantially as described.

11. In a draft-rigging mechanism, the combination with a draw-bar, of members carried by the car and adapted to receive the strains of buffing and draft, said members being capable of movement longitudinally of the car, and means coöperating with said members whereby there is imparted to the draw-bar when drawn to one side a tendency to return to its normal or central position, substantially as described

12. In a draft-rigging mechanism, the combination with the draft-sills, follower-stops, draw-bar, yoke, and a resistance medium, of followers disposed within and transversely of the yoke, said followers having their outer faces provided with cam-surfaces or inclines meeting at points coincident with the longitudinal axis of the resistance medium, and rollers carried by the yoke and engaging and coöperating with said cam-surfaces of the followers in the manner and for the purpose described.

13. In a draft-rigging mechanism, the combination with the yoke-strap having a vertical end wall and a follower, of a rocking contacting connection or bearing between said parts, the same comprising a straight or plane surface on one of said parts and a rounding convex surface on the other, as and for the purpose described.

14. In a draft-rigging mechanism, the combination with the yoke-strap having a vertical end wall and a follower, of a rocking connection or bearing between said parts, the same comprising a straight or plane surface on the end wall of the yoke and a rounding convex surface on the outer face of the follower, as and for the purpose described.

15. In a draft-rigging mechanism, the combination with the draw-bar and extension thereof, a resistance medium and an interposed rigid follower, of means between said draw-bar or its extension and the resistance medium serving to effect the application of the buffing or draft strain within the lateral limits of the draw-bar or extension thereof.

16. In a draft-rigging mechanism, the combination with the draw-bar and extension thereof, a resistance medium and an interposed rigid follower, of a rocking connection or bearing between said draw-bar and the resistance medium serving to effect the application of a draft or buffing strain at a point substantially on the axis of the resistance medium.

17. In a draft-rigging mechanism, the combination with the draw-bar and its yoke, rigid followers, and a resistance medium, of rocking connections or bearings between said draw-bar and yoke and said followers respectively, serving to effect the application of draft and buffing strains at points substantially on the axis of the resistance medium.

18. In a draft-rigging mechanism, the combination with the yoke-strap, the resistance medium, and an interposed follower, of a rocking connection or bearing between said resistance medium and follower, the same comprising a straight or plane surface on said follower and a rounding convex surface on the end of the resistance medium, as and for the purpose described.

19. The combination with a draw-bar located wholly or partially between the draft-sills, and a centering or controlling means independent of the resistance medium of the draft-rigging for returning the draw-bar when in an offset or abnormal position to a central or normal position, and means carried by the draw-bar through which the centering or controlling means acts on the latter, substantially as described.

20. The combination of a draw-bar located wholly or partially between the draft-sills, a centering or controlling means independent of the action of the resistance medium for returning the draw-bar when in an offset or abnormal position to a central or coupling position, and means carried by the draw-bar through which the centering or controlling means acts on the latter, said last-named means being detachably connected to the draw-bar, substantially as described.

21. In a draft-rigging mechanism, the combination with a draw-bar having a depending member in advance of the draft-rigging, of a draw-bar-centering device coöperating with said depending member to maintain the draw-bar in a central or normal position, substantially as described.

22. In a draft-rigging mechanism, the combination with a draw-bar having a detachable member in advance of the draft-rigging, of a draw-bar-centering device coöperating with said detachable member to maintain the draw-bar in a central or normal position, substantially as described.

23. A draw-bar centering or controlling device comprising telescoping members and an elastic medium carried thereby, said telescoping members having interengaging parts whereby they may be assembled and interlocked by a single operation, substantially as described.

24. In a draw-bar centering or controlling device comprising telescoping members and an elastic medium carried thereby, said telescoping members having interengaging parts whereby they may be assembled, put under tension and interlocked, by a single operation, substantially as described.

25. A draw-bar centering or controlling device comprising coöperating members and an elastic medium carried thereby, said members being adapted to be interlocked and maintained in engagement by the action of the resistance medium, substantially as described.

26. In a draw-bar-centering device, the combination with the draw-bar and a pair of sills between which said draw-bar is wholly or partially confined laterally, of a depending member on said draw-bar, and springs supported from and beneath the confining-sills transversely thereof and acting oppositely on said depending member of the draw-bar, substantially as described.

27. In a draw-bar-centering device, the combination with the draw-bar and a pair of sills between which said draw-bar is wholly or partially confined laterally, of a depending member on said draw-bar, cages or housings secured to the under side of said sills transversely thereof, and springs carried by said cages or housings and at their inner ends acting oppositely on said depending member of the draw-bar, substantially as described.

28. In a draw-bar-centering device, the combination with a pair of sills and a draw-bar lying wholly or partially between them, of a depending member on said draw-bar, spring cages or housings secured to the under sides of said sills transversely thereof, hollow thrust members interiorly telescoping the inner ends of said cages, and springs housed within said cages and thrust members and normally maintaining the latter in pushing contact with said depending member of the draw-bar, substantially as described.

29. In a draw-bar-centering device, the combination with a pair of sills and a draw-bar lying wholly or partially between them, of a depending member on said draw-bar, spring cages or housings secured to the under sides of said sills transversely thereof, hollow thrust members interiorly telescoping the inner ends of said cages, springs housed within said cages and thrust members and normally maintaining the latter in pushing contact with said depending member of the draw-bar, and rods longitudinally connecting said cages and thrust members, respectively, and limiting the outward movement of the latter to a point at which the draw-bar is centered, substantially as described.

30. In a draw-bar-centering device, the combination with a pair of outwardly-facing

channel-beams constituting sills and a draw-bar lying wholly or partially between them, of a depending member on said draw-bar, spring cages or housings bolted to the lower flanges of said sills and further secured thereto by interengaging lugs and sockets on said parts, respectively, and springs carried by said cages or housings and at their inner ends acting oppositely upon said depending member of the draw-bar, substantially as described.

31. The combination with the draft sills or beams and a draw-bar located therebetween and capable of angular movement, of centering or controlling devices carried by and fastened to the under side of said draft sills or beams, said centering or controlling devices operating independently of each other, substantially as described.

32. In a draft-rigging mechanism, the combination with a draw-bar capable of angular movement, of members adapted to move longitudinally of the draw-bar, said members and the draw-bar being provided with coöperating surfaces of different forms such that there will be imparted to the draw-bar, when drawn to one side, a tendency to return to a normal or central position, substantially as described.

33. In a draft-rigging mechanism, the combination with a draw-bar capable of angular movement, of members carried by the car, and antifriction devices carried by the draw-bar or extensions thereof and coöperating with said members to impart to the draw-bar a tendency to maintain a central position, substantially as described.

34. The combination of a draw-bar capable of angular movement and a draft-rigging, the latter being provided with a member having movement relatively to the draw-bar and longitudinally of the latter and adapted under the action of the resistance medium of the draft-rigging to return the draw-bar, when drawn to one side, to a central position.

35. The combination of a draw-bar and an extension thereof both capable of angular movement, of a follower intersecting said extension, and means for centering the draw-bar under the action of the resistance medium coöperating with said follower.

36. The combination of a draw-bar and an extension thereof both capable of angular movement, of a follower, and a combined resistance and draw-bar-centering medium both located within said extension of the draw-bar.

In testimony that I claim the foregoing as my invention I have hereunto subscribed my name in the presence of two witnesses.

GEORGE H. FORSYTH.

Witnesses:

JENNIE NORBY,

FREDERICK C. GOODWIN.