March 13, 1945. C. L. ORR ET AL 2,371,182

RAILWAY TRUCK AND RAILWAY BRAKING SYSTEM

Filed Dec. 29, 1942 7 Sheets-Sheet 1

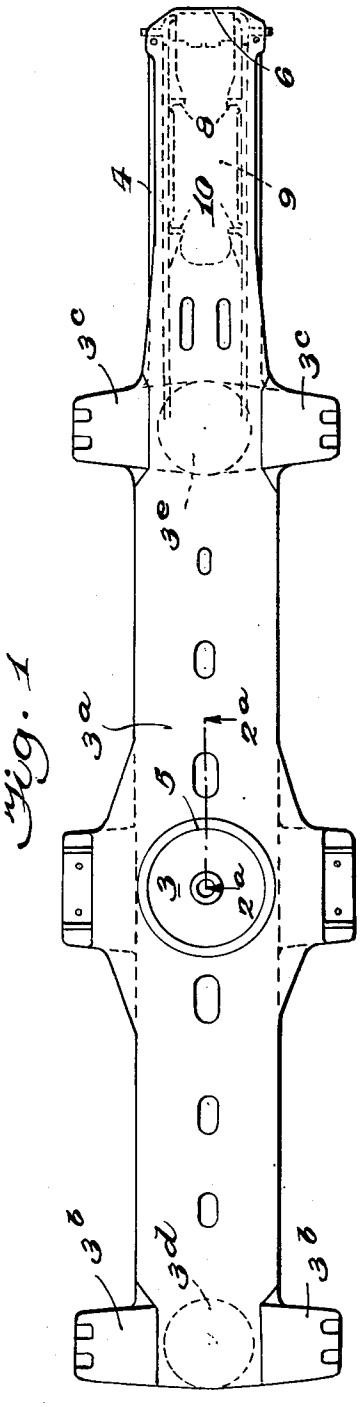


Fig. 1

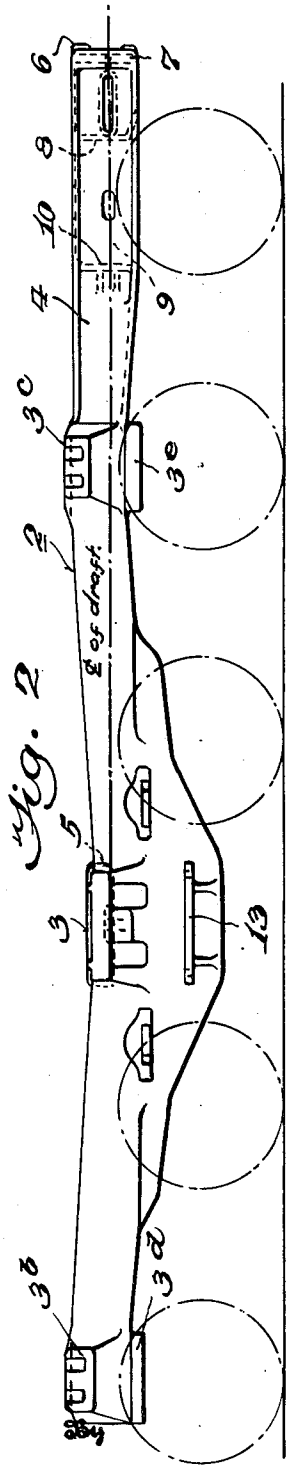


Fig. 2

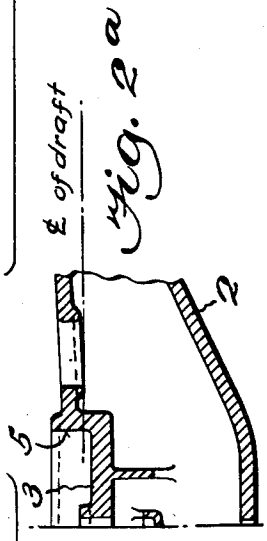


Fig. 2a

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RAILWAY TRUCK AND RAILWAY BRAKING SYSTEM

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Fig. 4

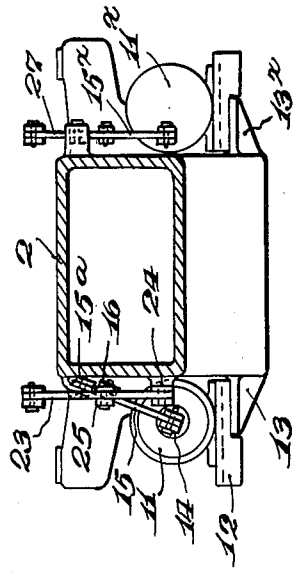
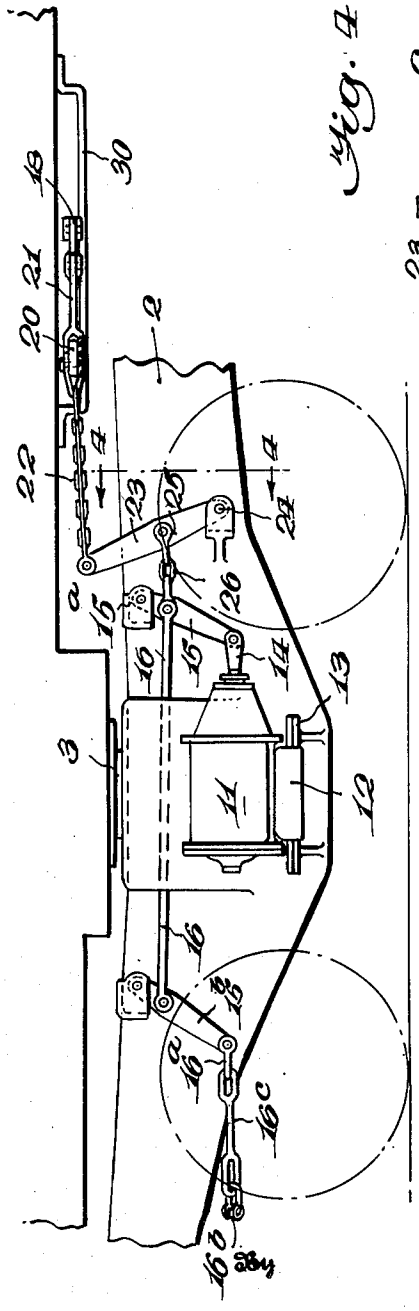


Fig. 5



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RAILWAY TRUCK AND RAILWAY BRAKING SYSTEM

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Fig. 5

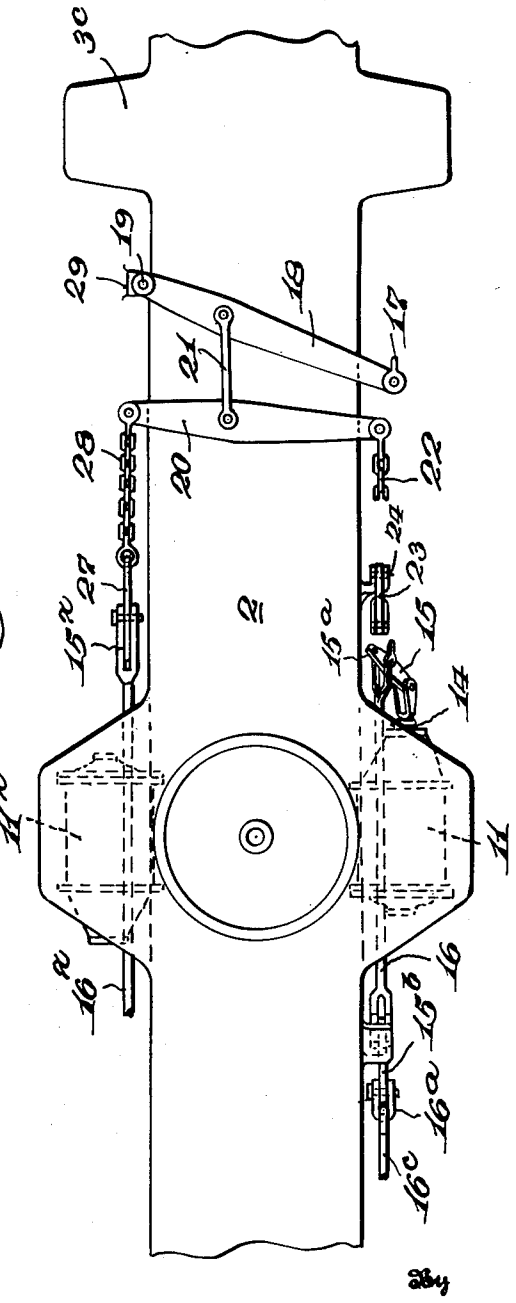
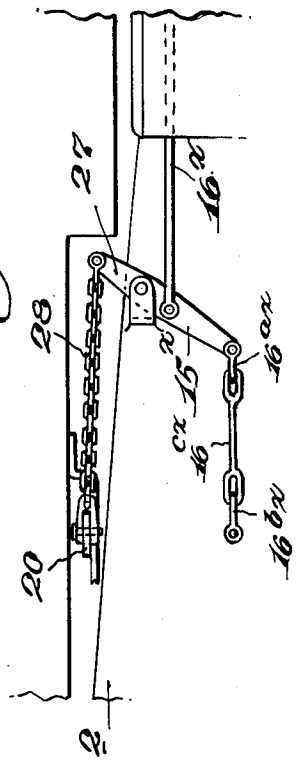


Fig. 6



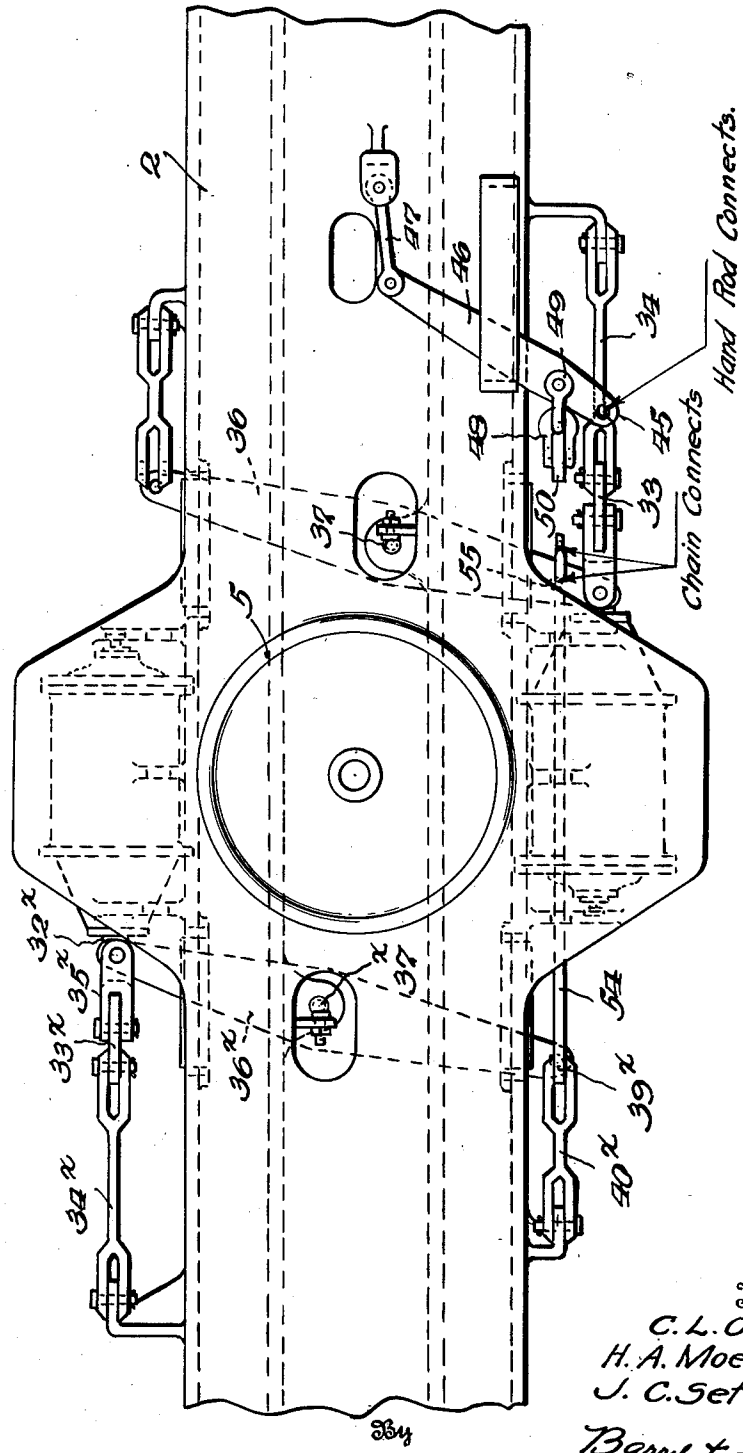
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RAILWAY TRUCK AND RAILWAY BRAKING SYSTEM

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Fig. 7



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RAILWAY TRUCK AND RAILWAY BRAKING SYSTEM

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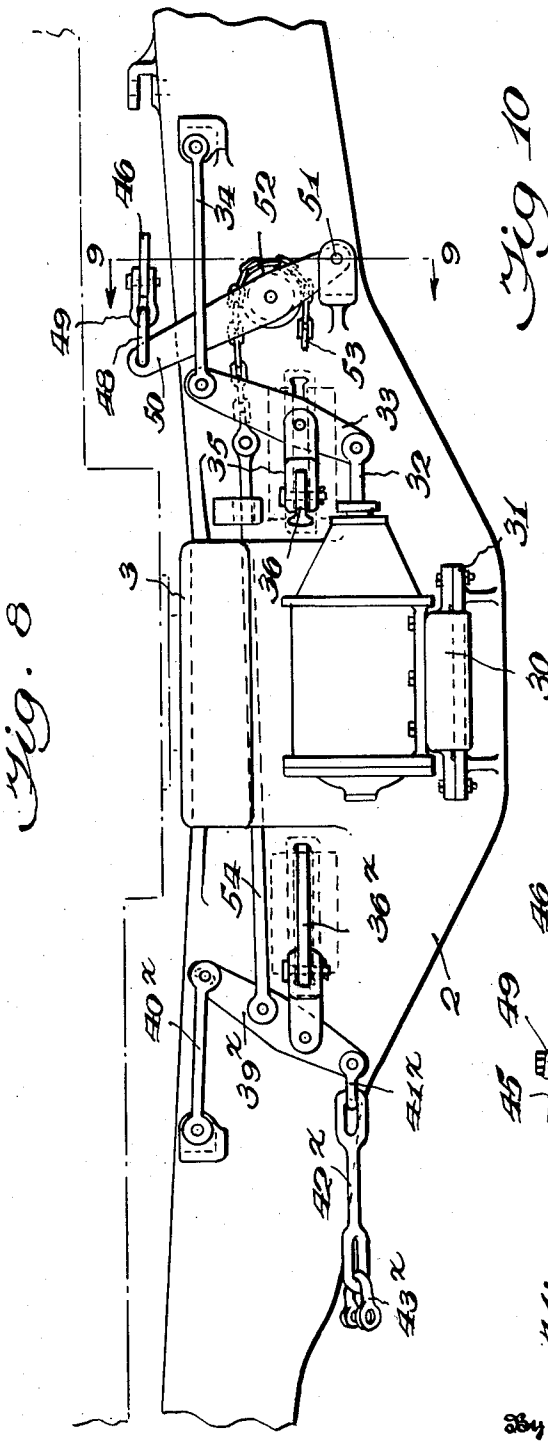


Fig. 8

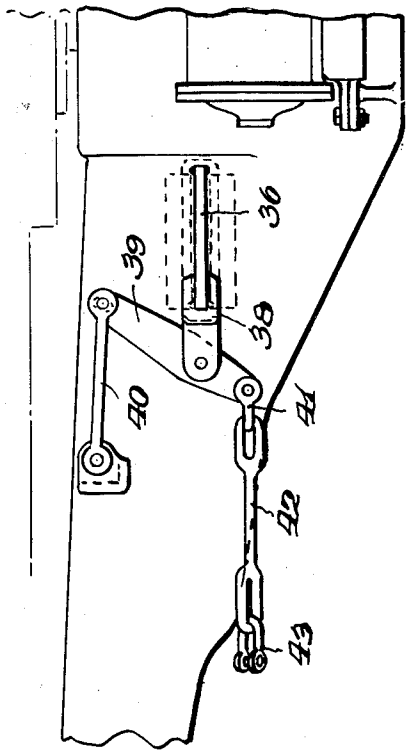


Fig. 10

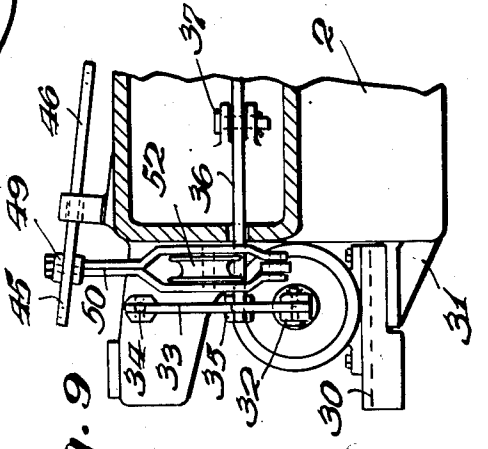


Fig. 9

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RAILWAY TRUCK AND RAILWAY BRAKING SYSTEM

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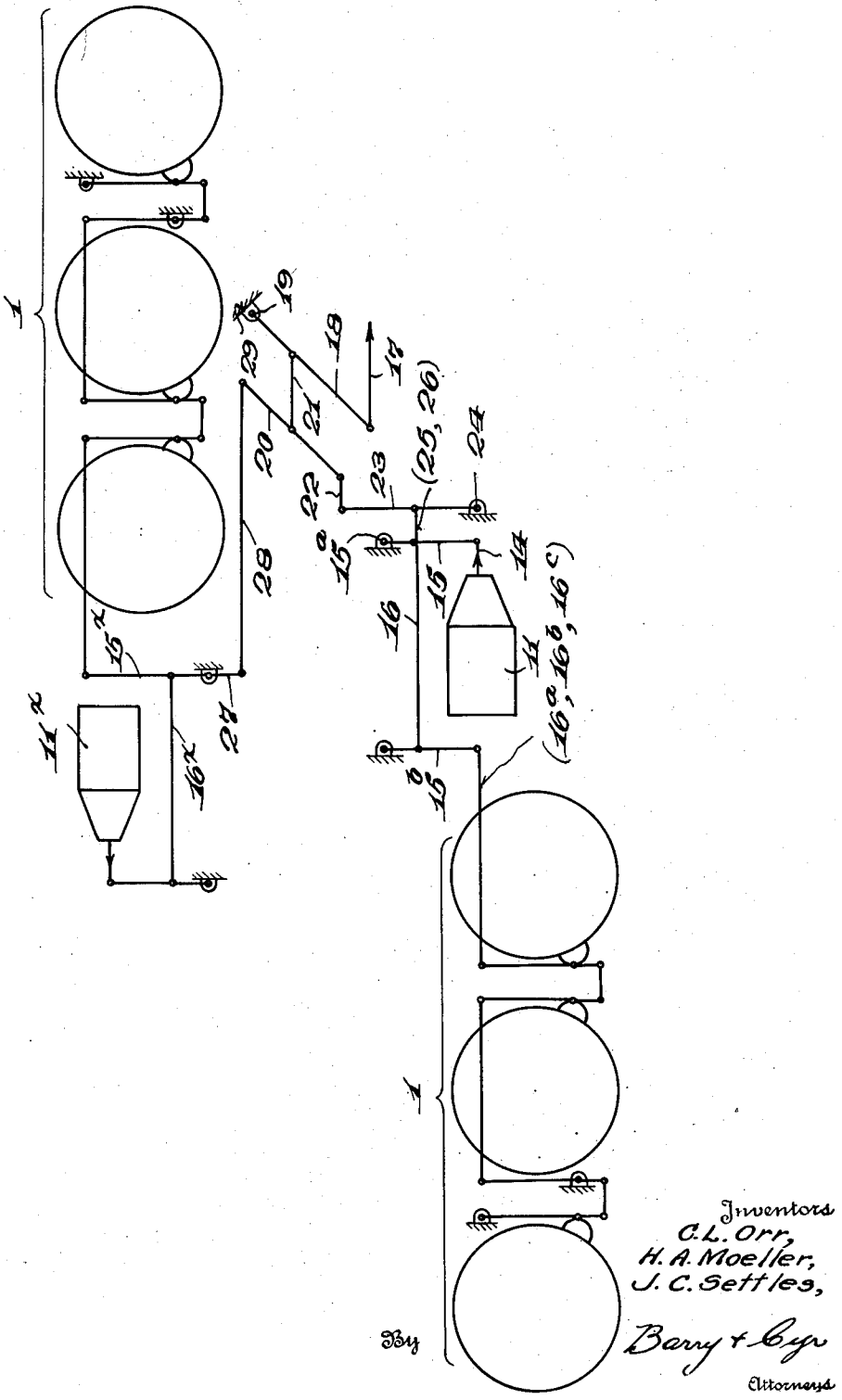


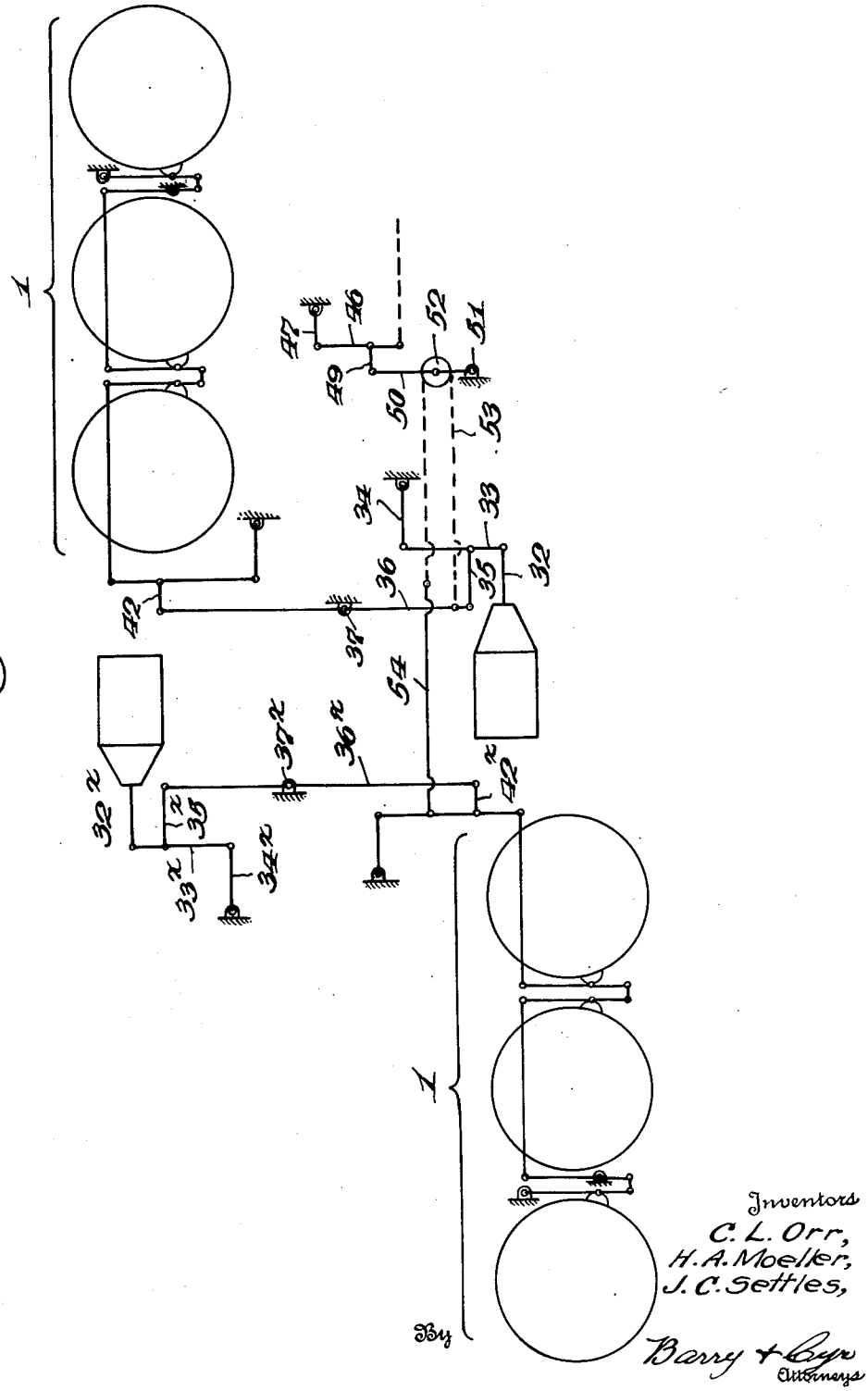
Fig. 11

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Fig. 12



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2,371,182

RAILWAY TRUCK AND RAILWAY BRAKING SYSTEM

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Application December 29, 1942, Serial No. 470,498

20 Claims. (Cl. 105—183)

This invention relates to eight and twelve-wheel car trucks for special high capacity cars.

The primary purpose of the invention is to provide improvements in trucks particularly useful on cars having long truck center spacings, and end overhangs, which conditions, when such a car passes around a curve, cause unusually large angles of swivel between the car bodies and the trucks, and end swingover in excess of that which can be accommodated by standard draft equipment when placed on the car body in the usual manner.

Another object is to provide a twelve-wheel truck in which the load is distributed in a practical manner from the bolster system to the wheels. This object can be achieved by employing a pair of six-wheel trucks, each of the equalizer type shown, for example, in the C. L. Orr Patent 2,040,706, dated May 12, 1936.

Another object is to provide a span bolster of special construction.

A further object is to supply brake actuating means arranged to be mounted at the middle portion of the span bolster.

A further object is to provide a brake actuating arrangement for each four-wheel or six-wheel truck, all parts of the arrangement lying on the same side of the span bolster, thereby contributing to ease of application, inspection and maintenance.

Another object is to furnish brake actuating mechanism employing long transverse levers extending transversely of the span bolster so that relatively small forces may be employed in applying the brake shoes to the wheels.

With the foregoing objects outlined and with other objects in view which will appear as the description proceeds, the invention consists in the novel features hereinafter described in detail, illustrated in the accompanying drawings, and more particularly pointed out in the appended claims.

In the drawings:

Fig. 1 is a top plan view of the improved span bolster.

Fig. 2 is a side elevation of the same shown associated with a pair of six-wheel trucks, one pair of wheels of one such truck being eliminated to facilitate illustration.

Fig. 2*a* is a longitudinal sectional view of a detail, taken on the line 2*a*—2*a* of Fig. 1.

Fig. 3 is a side elevation of the middle portion of the span bolster and a portion of the car body, with the preferred form of brake applying means associated therewith.

Fig. 4 is a transverse sectional view of the same taken on the line 4—4 of Fig. 3.

Fig. 5 is a top plan view, with certain parts broken away.

Fig. 6 is a side elevation of a detail.

Fig. 7 is a top plan view of the span bolster with a modified form of brake actuating mechanism associated therewith, and with parts broken away to assist in illustration.

Fig. 8 is a side elevation of the structure shown in Fig. 7, and also showing a portion of the car body in dot and dash lines.

Fig. 9 is a transverse sectional view on the line 9—9 of Fig. 8.

Fig. 10 is a side elevation illustrating a detail.

Fig. 11 is a diagram showing the complete braking mechanism corresponding to Figs. 3 to 6 inclusive.

Fig. 12 is another diagram illustrating the complete braking mechanism corresponding to Figs. 7 to 10 inclusive.

Referring first to Fig. 2, it illustrates in general the arrangement of a twelve-wheel truck consisting of two six-wheel trucks 1, a portion of one of which is missing from the view. Each of these trucks is preferably of the equalizer type, and the trucks are connected by a span bolster 2 having a center plate 3 for supporting a car body (not shown). At one end of the bolster, a draft extension 4, cast integral with the bolster, extends beyond the end of the car and is suitable for the application of standard draft equipment. The draft extension is approximately one-third the length of the bolster, and is proportioned to be as nearly symmetrical as is practical about the center line of the draft, in order to minimize bending action from draft forces. The center portion 3*a* of the bolster (Fig. 1) is proportioned so that the center line of draft passes through the rim 5 of the center plate (Fig. 2*a*), in order that the draft forces may pass through said rim into the car body without causing turning action in a vertical plane, on the span bolster. The bolster is provided at one end with oppositely extending side bearing arms 3*b*, and center plate 3*d* adapted to swivel on the bolster system (not shown) of the inner one of the six-wheel trucks; and about midway between the center plate 3 and the opposite end of the bolster, other arms 3*c* project, and center plate 3*e* is provided for swiveling on the bolster system of the other six-wheel truck.

The draft extension is preferably provided with an integral striker 6, coupler carrier 7, front draft lugs 8, draft gear pocket 9, and rear draft lugs

18 suitable for the application of standard draft equipment, which is not shown. As the draft lugs are integral with the extension, it is obvious that they reinforce the latter.

With a span bolster of this character, we combine novel brake actuating mechanism which will now be described, first with reference to Figs. 3 to 6 inclusive.

In these views, a brake cylinder 11 is supported on one side of the span bolster at the transverse center line of the car body center plate 3, by means of an adapter casting 12 and a shelf bracket 13. A piston (not shown) in the cylinder, actuates a push rod 14 pivotally connected to the lower end of a substantially vertical lever 15, the upper end of which is pivotally suspended from the span bolster, as shown at 15*a*. A second similar lever 15*b* is suspended from the span bolster at the opposite end of the brake cylinder, and the medial portions of these levers are pivotally secured to a connecting rod 16. The lower end of lever 15*b* is adapted to be connected by clevises 16*a* and 16*b*, and a link 16*c*, to the braking mechanism on the innermost one of the trucks. Such brake mechanism may be of any suitable character, for example, as shown in the Whitridge and Johnson Patent 1,232,145, or the Stertzbach et al. Patent 2,263,147.

In operation, when a pressure is introduced into the brake cylinder, the push rod 14 is forced outwardly, which results in movement of the levers 15, 15*b* in a counter-clockwise direction, so as to apply the brakes on the six-wheel truck positioned towards the middle of the car body.

The brakes on the six-wheel truck at the draft extension end of the twelve-wheel truck are operated by identical mechanism placed on the opposite side of the span bolster, and in reversed position. The parts for this mechanism are marked with the same corresponding numerals as on the car center end, but with suffixes "*x*."

With reference to this brake arrangement, it will be noted that all parts for the operation of the brakes of each six-wheel truck lie on the same side of the span bolster, thereby contributing to the ease of application, inspection and maintenance.

For hand operation of the brakes, the hand brake chain 17 (only a portion of which is shown in Fig. 5), is connected to one end of a horizontally disposed lever 18 which extends transversely across the top of the span bolster, and has its opposite end pivotally anchored as at 19, either to the car body or to the span bolster. A second horizontal floating lever 20 has an intermediate portion thereof connected by a link 21 to the intermediate portion of lever 18, so that the floating lever will move toward the extension end of the bolster when lever 18 is moved counter-clockwise (Fig. 5). A flexible connection, such as a chain 22, connects one end of lever 20 to the upper end of a lever 23, the lower end of which is pivotally connected to the span bolster, as at 24. A clevis 25 and link 26 connects an intermediate portion of lever 23 to one end of the rod 16. It will be obvious from Fig. 3 that when the chain 22 is pulled by the hand operated mechanism, the lever 23 will apply the brakes on the inner one of the six-wheel trucks in the same manner as the piston rod 14.

Referring again to Figs. 5 and 6, it will be noted that a lever 15*x*, which corresponds with 15*b*, has an upwardly extending extremity 27 that is connected by a chain 28 to the other end of the floating lever 20. Consequently, the floating lever will also actuate the brakes of the six-wheel truck at the extension end of the bolster, through the intermediary of the rod 16*cx* and clevises 16*ax* and 16*bx*, which are the equivalents of rod 16*c* and clevises 16*a* and 16*b* of Fig. 3.

The chains serve the double purpose of applying the proper pulls during operation of the hand brake, and also of furnishing slack between the cylinder operated and hand operated positions of the entire mechanism.

When the hand brake horizontal levers 18 and 20 are placed on the underside of the car body, as shown on the drawings, suitable supports 29 and 30 are required on the car body. Swivel between the twelve-wheel truck and car body is accommodated by the chains. It is obvious that if the support 29 is arranged on the span bolster, and the floating lever 20 is also mounted on the span bolster, the chain 22 may be changed to a pull rod, since slack between the cylinder and hand operation is provided by chain 28 on one side of the span bolster, and by clevis 25 and link 26 on the other side of the span bolster, and the swivel between the car body and twelve-wheel truck is accommodated by the chain 17 which connects the end of lever 18 to the hand brake mechanism on the car body.

In the brake operating mechanism illustrated in Figs. 7 to 10 inclusive, each of the cylinders is supported on one side of the span bolster at the transverse center line of the car body center plate 3 by means of an adapter casting 30 and shelf bracket 31. The brake cylinder push rod 32 at one side of the bolster is connected to the lower end of a substantially vertical lever 33, the upper end of which is fulcrumed to the span bolster by means of a rod 34. The medial portion of the lever is connected by a clevis 35 to one end of a transversely extending horizontal lever 36 which extends through the bolster and is mounted to swing about a vertical pin 37, as indicated in Fig. 7. The far end of the lever, as indicated in Fig. 10, is connected by a clevis 38 to the intermediate portion of a substantially vertical lever 39, the upper end of which is fulcrumed to the span bolster by means of a rod 40. The lower end of lever 39 is connected by a clevis 41 to a link 42 adapted to be connected by another clevis 43 to the brake applying means of the truck at the draft extension end of the bolster.

It is evident that when air pressure is introduced into the brake cylinder, the push rod 32 is forced out and the mechanism described above applies the brakes on the six-wheel truck at the draft extension end of the twelve-wheel truck.

The brakes on the six-wheel truck at the opposite end of the twelve-wheel truck are operated by identical mechanism placed on the opposite sides of the span bolster and in reversed position. The parts for this mechanism are marked with the same corresponding numerals as on the draft extension end, but with the suffixes "*x*" added.

The fulcrum rods 34, 40, 34*x* and 40*x* respectively accommodate the vertical motions of the substantially vertical levers, and eliminate vertical forces on the ends of the horizontal levers 36 and 36*x*.

The brakes on both six-wheel trucks may also be operated by a hand brake mechanism located on the end of the car body. In this construction, a chain or pull rod, not shown, connects the body portion of the hand brake mechanism with the outer end 45 (Fig. 7) of a substantially horizontal lever 46. The other end of the lever is fulcrumed through rod 47 to the top of the span bolster.

The medial portion of this lever is connected by clevises 48 and 49 to the top of another vertical lever 50. The lower end of the latter is fulcrumed to the span bolster, as indicated at 51. A sheave wheel 52 is rotatably mounted on lever 50 between the ends thereof for the accommodation of a chain 53. The chain has one of its ends connected to the intermediate portion of lever 39x by means of a pull rod 54, and the other end of the chain is connected to the horizontal lever 36, as indicated at 55 in Fig. 7. It will be evident that a pull on the medial portion of the chain 53 will actuate both levers 36, 39x, and thus apply the brakes to both six-wheel trucks.

Obviously, the span bolster may be used with either one of the brake actuating means and may be swiveled to a pair of four-wheel trucks instead of the two six-wheel trucks. Also, flexible cables or the like can be used, if desired, instead of chains.

While we have disclosed some preferred embodiments of the invention, it will be apparent that changes may be made in the details disclosed, without departing from the spirit of the invention, as expressed in the claims.

What is claimed and desired to be secured by Letters Patent is:

1. In a structure of the character described, a span bolster having an elongated body adapted to directly underlie the longitudinal center portion of a car body and provided with a center plate adapted to form a swivel connection for a car body, one end portion of the bolster being adapted to swivel on a first car truck, the underside of the bolster, about midway between said center plate and the opposite end of the bolster, being provided with means adapted to swivel on a second truck, and the opposite end portion of the bolster having a pocket therein adapted to receive a draft gear.

2. In a structure of the character described, a span bolster having an elongated body adapted to directly underlie the longitudinal center portion of a car body and provided with a center plate adapted to form a swivel connection for a car body, one end portion of the bolster being adapted to swivel on a first car truck, the underside of the bolster, about midway between said center plate and the opposite end of the bolster, being provided with means adapted to swivel on a second truck, and the opposite end portion of the bolster having a pocket therein adapted to receive a draft gear both end portions of the bolster being in horizontal alignment.

3. In a structure of the character described, a span bolster having an elongated body adapted to directly underlie the longitudinal center portion of a car body and provided with a center plate adapted to form a swivel connection for a car body, one end of the bolster being adapted to swivel on a first car truck, the underside of the bolster, about midway between said center plate and the opposite end of the bolster, being provided with means adapted to swivel on a second truck, the portion of the bolster between the last mentioned means and the last mentioned end of the bolster forming a draft gear extension.

4. In a structure of the character described, a span bolster having an elongated body adapted to directly underlie the longitudinal center portion of a car body and provided with a center plate adapted to form a swivel connection for a car body, one end of the bolster being adapted to swivel on a first car truck, the underside of the bolster, about midway between said center plate and the opposite end of the bolster, being provided with means adapted to swivel on a second truck, the portion of the bolster between the last mentioned means and the last mentioned end of the bolster forming a draft gear extension and being provided with integral front and rear draft lugs.

5. In a structure of the character described, a span bolster comprising a one-piece casting provided at the top thereof with a swivel connection adapted to support a car body, one end portion of the bolster having oppositely extending side bearing arms and provided at the underside thereof with means adapted for swivel connection with the bolster system of a car truck, the opposite end portion of the bolster having a pocket therein adapted to receive a draft gear the bolster being provided about midway between the first mentioned swivel connection and the last mentioned end of the bolster with oppositely extending side bearing arms, and a bottom swivel connection adapted to engage a second car truck.

6. In a structure of the character described, a span bolster comprising an elongated one-piece casting adapted to directly underlie the longitudinal center of a car body and provided at the top thereof with a swivel connection adapted to support a car body, one end of the bolster having oppositely extending side bearing arms and provided at the underside thereof with means adapted for swivel connection with the bolster system of a car truck, the bolster being provided about midway between the first mentioned swivel connection and the opposite end of the bolster with oppositely extending side bearing arms, and a bottom swivel connection adapted to engage a second car truck, the portion of the bolster between the last mentioned arms and the last mentioned end of the bolster forming a draft gear extension.

7. In a structure of the character described, a span bolster comprising a one-piece casting provided at the top thereof with a swivel connection adapted to support a car body, one end portion of the bolster having oppositely extending side bearing arms and provided at the underside thereof with means adapted for swivel connection with the bolster system of a car truck, the opposite end portion of the bolster having a pocket therein adapted to receive a draft gear the bolster being provided about midway between the first mentioned swivel connection and the last mentioned end of the bolster with oppositely extending side bearing arms, and a bottom swivel connection adapted to engage a second car truck, the end portions of the bolster being in horizontal alignment.

8. In a structure of the character described, an elongated one-piece span bolster adapted to directly underlie the longitudinal center of a car body and provided at one end thereof with oppositely extending side bearing arms and a bottom connecting device adapted to swivel on a car truck, second oppositely extending arms forming parts of the bolster and spaced from the opposite end of the bolster, the portion of the bolster between the last mentioned arms and the last mentioned end thereof, forming a draft gear extension, means at the underside of the bolster where the last mentioned arms are located to form a swivel connection with a second car truck, the bolster being widened about midway between the first mentioned and second mentioned arms, the top of the widened portion of the bolster being

provided with a swivel connection adapted to support a car body.

9. In a structure of the character described, a pair of car trucks, a span bolster having a swivel connection with each of said trucks, the span bolster having an elongated body positioned at the longitudinal center of the trucks and including an integral draft extension projecting outwardly beyond any of the wheels of said trucks, the span bolster, also, having a swivel connection midway between the swivel connections for the car trucks for supporting a car body, the supporting surface of the swivel connection for the car body being in substantially the same horizontal plane as the central line of the draft extension.

10. A cast metal span bolster provided at one end thereof with oppositely extending side bearing arms, the last mentioned end of the bolster being provided at the underside thereof with a swivel connection adapted to engage the bolster system of a car truck, second side bearing arms projecting from the bolster in spaced relation to the opposite end portion of the bolster, the portion of the bolster between the last mentioned end and the last mentioned arms forming a draft gear extension, the underside of the bolster, where the last mentioned arms are located, being provided with a swivel connection for engagement with a second car truck, the end portions of the bolster being in horizontal alignment, a portion of the bolster between said pairs of arms being wider and deeper than the remainder of the bolster and provided at the top thereof with a swivel connection adapted to engage a car body.

11. In a railway car truck, a span bolster, a pair of cylinders carried by the span bolster and arranged symmetrically at opposite sides of said bolster, a push rod projection in one direction from one of said cylinders, another push rod projecting in the opposite direction from the other of said cylinders, pairs of levers fulcrumed to the span bolster, means connecting the levers of each pair to cause them to move substantially in unison, one of the levers of each pair being connected to the push rod of one of the cylinders, and brake applying means operatively connected to the other lever of each pair.

12. In a railway car truck, a span bolster, a pair of cylinders carried by the span bolster and arranged symmetrically at opposite sides of said bolster, a push rod projecting in one direction from one of said cylinders, another push rod projecting in the opposite direction from the other one of said cylinders, and brake applying means operatively connected to said push rods, said brake applying means including substantially vertical pairs of levers having their upper ends fulcrumed to the span bolster and one lever of each pair having its lower end connected to the push rod of one of the cylinders.

13. In a railway car truck, a span bolster provided with a center plate, a pair of cylinders carried by the span bolster and arranged symmetrically at opposite sides of said plate, a push rod projecting in one direction from one of said cylinders, another push rod projecting in the opposite direction from the other one of said cylinders, and brake applying means operatively connected to said push rods, said brake applying means including substantially vertical levers having their lower ends connected to the push rods and their upper ends fulcrumed to the span bolster, second substantially vertical levers having upper end portions fulcrumed to the span bolster, means operatively connecting certain of said levers, and brake actuating elements connected to the second levers.

14. In a railway car truck, a span bolster provided with a center plate, a pair of cylinders carried by the span bolster and arranged symmetrically at opposite sides of said plate, a push rod projecting in one direction from one of said cylinders, another push rod projecting in the opposite direction from the other one of said cylinders, brake applying means operatively connected to said push rods, said brake applying means including substantially vertical levers having their lower ends connected to the push rods and their upper ends fulcrumed to the span bolster, second substantially vertical levers having upper end portions fulcrumed to the span bolster, means operatively connecting certain of said levers, and brake actuating elements connected to the second levers, one of the first mentioned levers and one of the second levers being positioned at the same side of the span bolster, and the means connecting them being arranged at the same side of the span bolster.

15. In a railway car truck, a span bolster provided with a center plate, a pair of cylinders carried by the span bolster and arranged symmetrically at opposite sides of said plate, a push rod projecting from each cylinder, a pair of levers fulcrumed to each side of the span bolster and fulcrumed to the bolster at opposite ends of the cylinder at that side thereof, a rod pivotally connected to the levers of each pair, means connecting each push rod to one of the levers of each pair, and brake applying means connected to the other lever of that pair.

16. In a railway car truck, a span bolster provided with a center plate, pairs of substantially vertical levers carried by the span bolster and arranged symmetrically at opposite sides of said plate, means operatively connecting the levers of each pair to cause them to move in unison, a third lever operatively connected to one of the levers of one pair at one side of the bolster, brake applying means operatively connected to the other lever of that pair, a floating lever extending transversely of the span bolster, a chain connecting the third lever with one end of the floating lever, another chain connecting the other end of the floating lever with one of the levers at the opposite side of the span bolster, and hand actuated means for moving the floating lever away from said center plate.

17. In a railway car truck, a span bolster provided with a center plate, a pair of cylinders carried by the span bolster and arranged symmetrically at opposite sides of said plate, a push rod projecting in one direction from one of said cylinders, another push rod projecting in the opposite direction from the other one of said cylinders, substantially vertical levers having their upper ends fulcrumed to the span bolster and their lower ends connected to the push rods, substantially horizontal levers extending transversely of the span bolster and having their medial portions pivotally mounted on the span bolster, means operatively connecting medial portions of the substantially vertical levers to certain ends of the transverse levers, other substantially vertical levers having their upper ends fulcrumed to the span bolster, and their medial portions connected to the other ends of the transverse levers, and brake actuating means operatively connected to the lower ends of said other levers.

18. In a railway car truck, a span bolster pro-

vided with a center plate, a cylinder carried by the span bolster and arranged at one side of said plate, a push rod projecting from said cylinder, a substantially vertical lever having its upper end fulcrumed to the span bolster at one side of the latter, and its lower end connected to the push rod, a transverse lever extending through the span bolster and having its medial portion pivotally connected thereto, means connecting one end of the transverse lever to an intermediate portion of the first mentioned lever, a third lever positioned at the opposite side of the span bolster and having its upper end fulcrumed to the bolster, means operatively connecting the intermediate portion of the third lever to the other end of the transverse lever, and braking actuating means connected to the lower end of the third lever.

19. In a railway car truck, a span bolster provided with a center plate, a pair of brake actuating levers extending through the bolster at opposite sides of said plate and having their medial portions pivotally connected to the bolster for movement about vertical axes, a substantially vertical lever pivotally connected to the span bolster and also pivotally connected to an end of one of the transverse levers at one side of said bolster, a rod connected to said substantially vertical lever, a chain having one of its ends connected to the rod and its other end connected to the other one of the transverse levers at the last mentioned side of the bolster, a sheave wheel about which the chain extends, another lever having one of its ends pivotally connected to the span bolster, the sheave wheel being rotatably carried by the medial portion of the last mentioned lever, and hand actuated means connected to the opposite end of the last mentioned lever for swinging it about its pivotal connection with the span bolster.

20. A cast metal span bolster comprising an elongated body provided at one end thereof with oppositely extending side bearing arms, the same end of the bolster being provided at the underside thereof with a swivel connection adapted to engage the bolster system of a car truck, second side bearing arms projecting from the body in spaced relation to the opposite end portion of the bolster, the portion of the bolster between the last mentioned end and the last mentioned arms forming a draft gear extension having a pocket adapted to receive a draft gear, the underside of the bolster where the last mentioned arms are located being provided with a swivel connection for engagement with a second car truck, the end portions of the bolsters being in horizontal alignment, a portion of the bolster midway between said pairs of arms being provided at the top thereof with a swivel connection adapted to engage a car body.

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