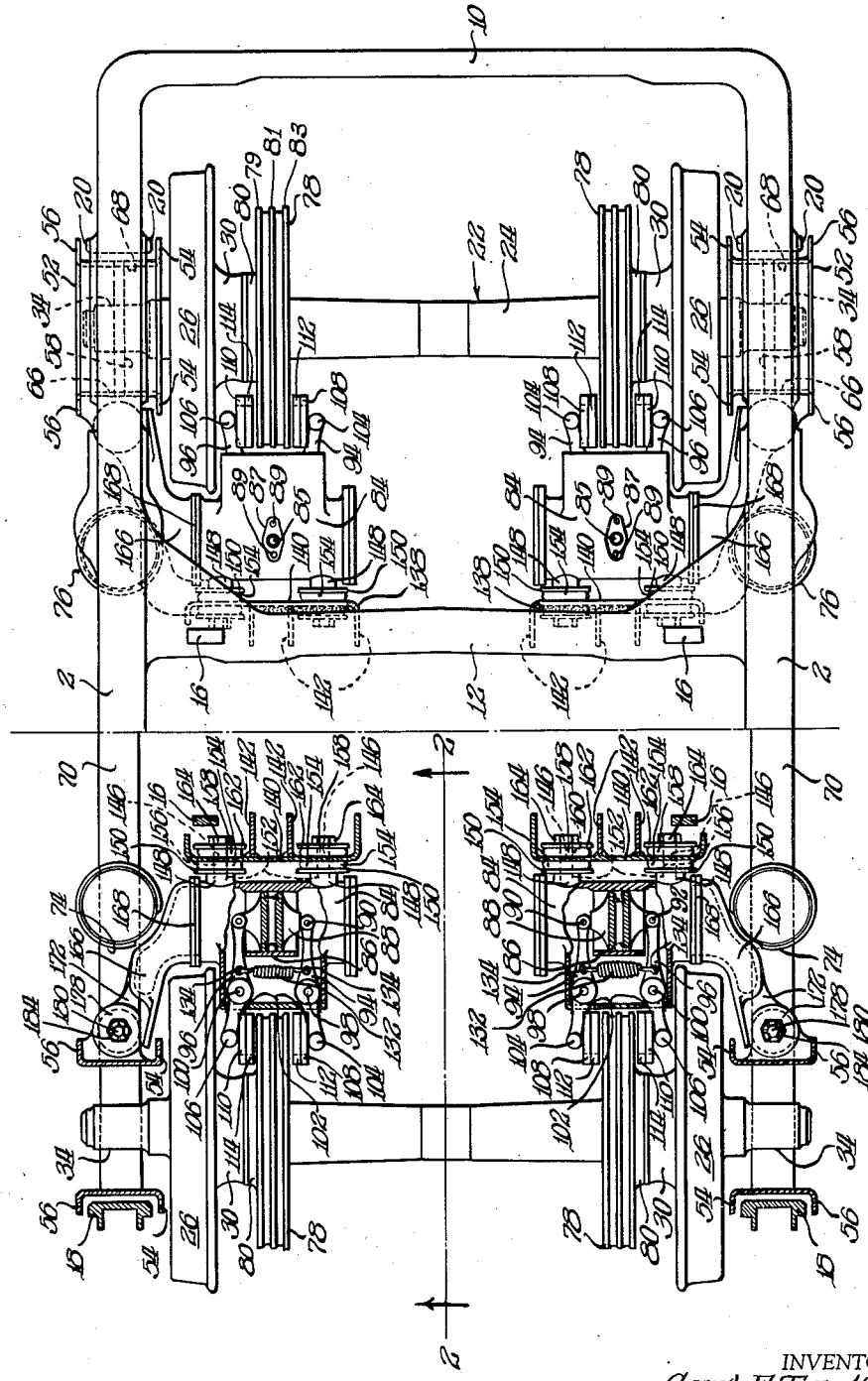
Aug. 8, 1944. C. E. TACK 2,355,122

ROTOR BRAKE

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Fig. 1.



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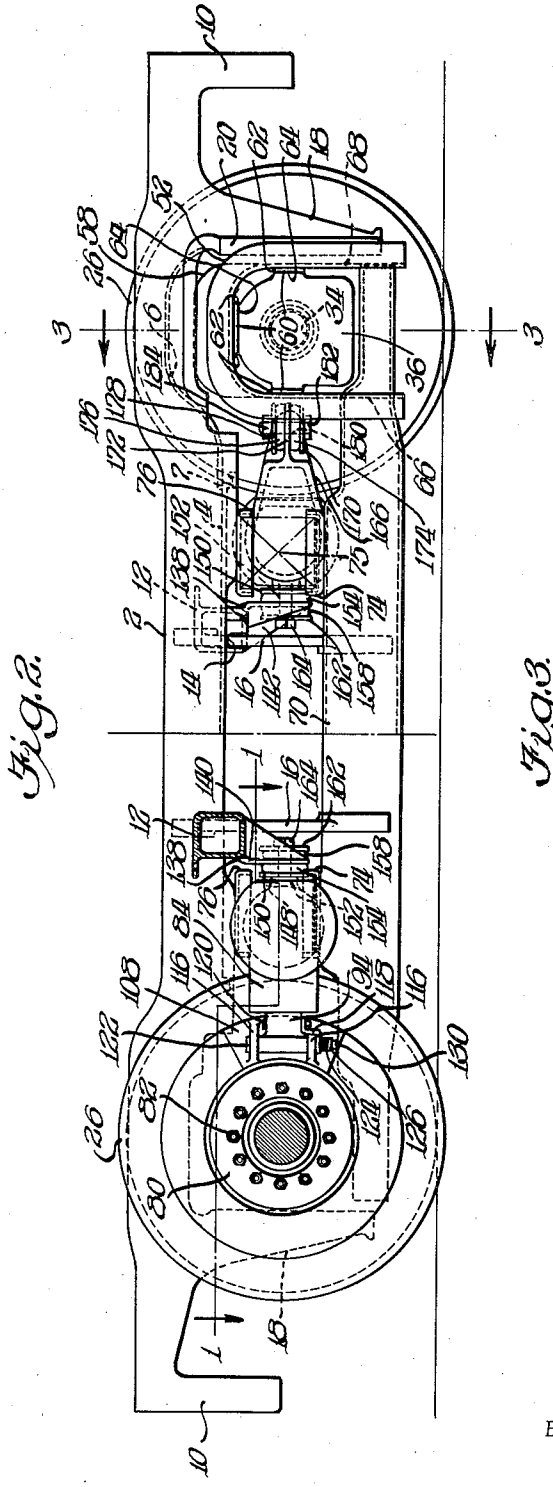


Fig. 2.

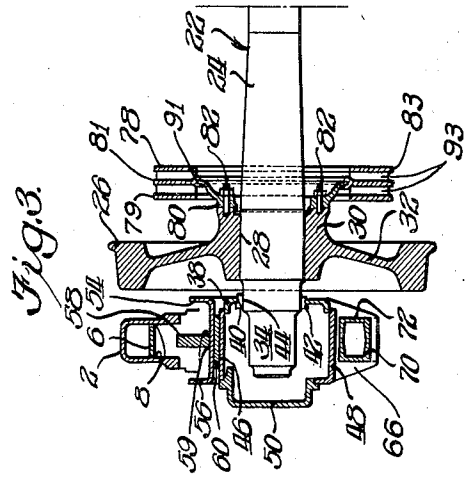


Fig. 3.

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UNITED STATES PATENT OFFICE

2,355,122

ROTOR BRAKE

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Application December 18, 1941, Serial No. 423,455

26 Claims. (Cl. 188—59)

My invention relates to brake rigging for a railway car truck and more particularly to a novel disc type brake and actuating means therefor supported between the wheels of a railway wheel and axle assembly.

My invention contemplates an arrangement wherein a rotatable braking disc is secured to the inboard hub of each wheel of a railway wheel and axle assembly and wherein brake shoes are supported at opposite sides of said disc, said shoes squeezing the disc between them upon actuation of the brake mechanism.

A specific object of my invention is to provide a novel support for said brake shoes, said support being nonconcentric with respect to the associated wheel and axle assemblies in order that said shoes may move with respect to the associated brake discs in a so-called "washing" action thus preventing the formation of concentric grooves in said shoes and in the associated brake discs as more fully described in my co-pending application for Letters Patent, Serial No. 421,418, filed December 3, 1941.

A further object of my invention is to provide in a braking device such as that above described a novel brake disc of the type shown and more fully described in my co-pending application for Letters Patent, Serial No. 409,999, filed September 8, 1941, one of said discs being secured to each wheel of each wheel and axle assembly and comprising a plurality of spaced parallel annular plates joined by equidistantly spaced radially arranged webs or blades, said disc functioning as a rotary blower to draw air into the spaces between the plates, thus cooling said disc.

Still another object of my invention is to design a novel support for an air cylinder housing including a cylinder actuating the above described brake mechanism, said support comprising a resilient connection to a bracket secured to the associated transom of the truck frame and a resilient connection to a yoke mounted on the associated journal box, thus causing said housing and the brake rigging connected thereto to move in co-ordination with lateral and vertical movement of the associated wheel and axle assembly.

In the drawings, Figure 1 is a top view of a railway car truck embodying my novel brake arrangement, the left half thereof being a partially sectional view in the horizontal planes indicated by the lines 1—1 of Figure 2 and the right half thereof being a plan view.

Figure 2 is a side view of the structure shown in Figure 1, the left half thereof being a sectional view in the vertical plane indicated by the line 2—2 of Figure 1 and the right half thereof being a view in elevation.

Figure 3 is a fragmentary sectional view in the transverse vertical plane bisecting the wheel and axle assembly shown at the right in Figures 1 and 2 and substantially as indicated by the line 3—3 of Figure 2.

Describing the structure in detail, my novel arrangement comprises a truck frame of usual form comprising the side rails 2, 2 each being of U-section and reinforced by the flat horizontal webs 4, 4 and the arcuate horizontal webs 6, 6 seated thereon as at 7, 7, said webs being welded to the side rail as at 8, 8 (Figure 3). Said frame also comprises end rails 10, 10 and integrally formed spaced transoms 12, 12 slotted as at 14 as seen at the right in Figure 2 for the reception of swing hangers 16, 16 affording usual support for a load carryiny member (not shown), said member affording a support for a car body which may be superposed thereon. Adjacent each end of each side rail 2 is formed a depending pedestal leg 18 comprising wear pads 20, 20 formed thereon or secured thereto in any convenient manner, and extending between the side rails at each end of the truck is a wheel and axle assembly generally designated 22 and comprising an axle 24 and wheels 26, 26 each being fitted thereon as at 28 (Figure 3) and comprising a hub 30 and a plate member 32.

Outboard each wheel the axle 24 comprises a journal end 34 received within the associated journal box 36 and supported therein in usual manner by bearing means (not shown), said box comprising an inboard wall 38 having an opening 40 therein. A dust protector 42 is positioned within the opening 40 and the journal end of the associated axle is received within said protector as at 44. The journal box also comprises top and bottom walls 46 and 48 and a cover plate 50. Each journal box is received within a U-shaped yoke 52 as best seen at the right in Figure 2, said yoke being of U-section as best seen in Figure 3 and comprising inboard and outboard flanges 54 and 56 and the intermediate vertical reinforcing rib 58 secured to said yoke as at 59, 59. Pads 60, 60 are secured to said yoke as by welding at 62, 62, said pads affording positioning means for the associated journal box as at 64, 64. Each yoke comprises inner and outer legs 66 and 68 with aligned openings therethrough in which an end of the associated equalizer 70 is fitted as at 72 (Figure 3) and secured in any convenient manner. Between the flanges 54 and 56 on the

outer leg 68 of each yoke is positioned the associated pedestal leg 18 of the truck frame, the wear pads 20, 20 on said leg cooperating with said flanges to limit relative lateral motion of said yoke and said side frame.

Each equalizer 70 comprises spaced spring caps 74, 74 secured thereto in any convenient manner and likewise the associated side frame 2 is provided with a spring cap 76 positioned above each cap 74. A coil spring 75 (diagrammatically indicated) extends between each cap 74 and the associated cap 76 and resiliently supports the side frame upon the equalizer 70.

Secured to the hub 30 of each wheel 26 is a rotatable disc or rotor 78 comprising a bell-shaped member 80 secured to said hub by spaced studs 82, 82.

Each rotor 78, as may best be seen in Figure 3 and as more fully described in my last-mentioned co-pending application, is an integral casting comprising three spaced plates, 79, 81, and 83 of annular form and arranged in parallel planes, the central plate 81 being connected at the inner perimeter thereof as at 91 to the bell-shaped member 80. Integrally joining the central plate 81 with the plates 79 and 83 on opposite sides thereof are a series of equidistantly spaced radially arranged blades 93, 93, the blades between the plate 79 and the plate 81 being aligned with the blades between the plate 83 and the plate 81 in such a manner as to form columns between the plates 79 and 83 for resistance of pressure applied thereto by the associated brake mechanism as hereinafter more fully described. It may be noted that the relatively wide space between the plate portion of each wheel 26 and the adjacent friction plates of the associated rotor axords a large air intake so that cooling air may be drawn through the blades 93, 93 of the rotor at the inboard and outboard sides thereof and as more fully described in my said last-mentioned co-pending application.

The actuating means for my novel brake arrangement associated with each disc comprises a housing 84 supported in manner hereinafter described and having an air cylinder 86 integrally formed therewith and with pistons 88, 88 confined therein at opposite ends thereof in usual manner. Atop each housing 84 is an opening 85 leading to said cylinder 86 and said opening is provided with a bracket 87 secured as at 89, 89 to the top of said housing and affording convenient means of connection to an air supply pipe (not shown). Said pistons 88, 88 have pivotal connection as at 90 and 92 with the inboard and outboard levers 94 and 96 and said levers are afforded fulcrums on said housing at 98 and 100 respectively. The levers 94 and 96 extend through openings 102, 102 in the housing 84 and the outer extremities thereof having pivotal connection as at 104 and 106 respectively with the brake heads 108 and 110 on which may be mounted brake shoes 112 and 114, said shoes being disposed opposite each other and arranged for frictional engagement with the annular braking surfaces formed at opposite sides of the associated brake disc. The form of connection of each lever arm with the associated brake head is well illustrated at the left of Figure 2 where it may be noted that said head is provided with spaced lugs 116, 116 between which is received the end of the lever 94. At the bottom of the lever 84 adjacent the end thereof, a bracket 118 is secured by the bolt and nut assembly 120, said bracket underlying the bottom lug 116 on the associated brake head. A pin 122 extends through aligned openings in said lugs, said lever end and said bracket, and over the lower end of said pin a friction spring 124 is sleeved, said spring being secured by the washer 126. A nut 130 is threaded on the lower end of the pin 122 and is tightened to place the spring 124 under compression. Intermediate the fulcrums 98 and 100 of said levers 94 and 96 and the connection of said levers at 90 and 92 to the pistons 88, 88, a release spring 132 is secured at the ends thereof as at 134, 134.

Secured to each transom 12 as at 138, 138 are brackets 140, 140 reinforced by spaced triangular vertical ribs 142, 142. Each housing 184 comprises a plurality of hollow lugs 148, 148 with plates 150, 150 secured thereon and rods 152, 152 extending through said lugs and said plates. An annular rubber-like pad 154 is positioned between each plate 150 and the associated bracket 140. The outer end of each rod 152 extends through the associated pad 154, through the adjacent bracket 140 and through the rubber-like pad 158 positioned between the bracket 140 and the washer 162, said washer being secured by the nut 164 threaded on the end of said rod and thus compressing the rubber pads 154 and 158 between the bracket 140, the plate 150 and the washer 162.

A torque arm 166 is secured to the housing 84 as at 168 and comprises a flat lug 172 at the end thereof as best seen at the right in Figure 2, said lug overlying a similar lug 170 formed on the associated yoke 52. An annular rubber-like pad 174 is interposed between the lugs 170 and 172 and an identical pad 176 is positioned atop the lug 172. A washer 178 is seated on the pad 176 and a bolt 180 comprising a head 182 abutting the bottom of the lug 170 extends upwardly through both of said lugs 170 and 172, both of said pads 174 and 176, and through the washer 178 and is secured by a nut 184 threaded on the upper end thereof, said nut being tightened to place said pads under compression.

Thus it will be apparent that I have provided a novel disc brake arrangement in which the brake heads associated with the brake disc mounted on each wheel of each wheel and axle assembly of a railway car truck are afforded a support nonconcentric with respect to said assembly and an arrangement in which said heads are permitted lateral movement resiliently controlled and in co-ordination with lateral movement of said assembly.

It will also be apparent to those skilled in the art that said nonconcentric support permits the shoes to move with respect to the associated brake discs in a "washing" action as more fully described in my first-mentioned co-pending application, said action preventing the wearing of concentric grooves in said shoes and said discs.

It is to be understood that I do not wish to be limited by the exact embodiment of the device shown which is merely by way of illustration and not limitation as various and other forms of the device will, of course, be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In a brake arrangement for a railway car truck, a frame member, spaced supporting wheel and axle assemblies each comprising an axle having journal ends and wheels fitted on said axle, rotatable brake discs supported on said wheels, journal boxes receiving therein said journal ends, yokes mounted on said boxes, an equalizer joining the yokes at each side of the truck, resilient

means seated on said equalizers and supporting said frame member, brake shoes formed and arranged for frictional engagement with said discs, and actuating means for said shoes comprising brake heads secured thereto, cylinder housings mounted on said frame and connected to the associated yokes, cylinders formed in said housings, pistons at opposite ends of each cylinder, and levers having pivotal connection to said brake heads and being operatively secured to said pistons, said last-mentioned connection comprising spaced lugs on each head and receiving therebetween the end of the associated lever, a bracket on said lever underlying one of said lugs, a pin extending through aligned openings in said lugs, said last-mentioned end, and said bracket, and a spring secured to the end of said pin and abutting said bracket thereby affording frictional control of the pivotal connection.

2. In a brake arrangement for a railway car truck, a frame member, spaced supporting wheel and axle assemblies each comprising an axle having journal ends and wheels fitted on said axle, rotatable brake means supported on said wheels, journal boxes receiving said journal ends, yokes mounted on said boxes, an equalizer joining the yokes at each side of the truck, resilient means seated on said equalizers and supporting said frame member, brake shoes supported at opposite sides of each rotatable brake means, and actuating means for said shoes comprising brake heads secured thereto, a cylinder housing mounted on said frame and connected to the associated yoke, a cylinder formed in said housing, pistons at opposite ends of said cylinder, and levers pivotally connected at one end to said heads, at the other end to said pistons, and at an intermediate point to said housing.

3. In a brake arrangement for a railway car truck, a frame member, spaced supporting wheel and axle assemblies each comprising an axle having journal ends and wheels fitted on said axle, rotatable brake means supported on said wheels, journal boxes receiving said journal ends, yokes mounted on said boxes, equalizing means joining the yokes at each side of the truck, coil springs seated on said equalizing means and supporting said frame member, brake shoes supported at opposite sides of each rotatable brake means, and actuating means for said shoes comprising a cylinder housing resiliently mounted on said frame and resiliently connected to the associated yoke, a cylinder formed in said housing, pistons at opposite ends of said cylinder, and levers associated with said shoes and having an operative connection to said pistons.

4. In a brake arrangement, a frame member, a supporting wheel and axle assembly comprising an axle having a journal end and a wheel fitted on said axle, journal means associated with said end, a disc secured to said wheel, friction shoes associated with said disc, actuating means for said shoes, and a resilient support for said actuating means comprising a bracket secured to said frame member, a spring plate secured to said actuating means, a rubber-like pad interposed between said plate and one side of said bracket, a similar pad abutting the opposite side of said bracket, aligned openings through said pads, said bracket, and said plate, a pin secured to said actuating means and extending through said openings, and securing means for said support associated with said pin, and a connection between said actuating means and said journal means.

5. In a brake arrangement, an axle having a journal end, a wheel fitted on said axle, journal means associated with said journal end, a disc secured to said wheel, friction shoes associated with said disc, actuating means associated with said shoes, and a resilient support for said actuating means comprising an arm secured thereto and having a flat end portion, a yoke secured to said journal means and having a flat lug underlying said portion, rubber-like pads positioned respectively atop said portion and between said lug and said portion, aligned openings through said pads, said lug, and said portion, a bolt extending through said openings and comprising a head at one end thereof abutting said lug, and securing means associated with the opposite end of said bolt.

6. In a brake arrangement, a wheel and axle assembly, journal boxes associated therewith, a rotor driven by said assembly, brake shoes formed and arranged for engagement with said rotor, and support means for said shoes comprising rigid means connected thereto and means affording a resilient support for said rigid means from one of said boxes at a point lying substantially in a horizontal plane passing through the axis of said assembly, said support being nonconcentric with respect to said assembly.

7. In a brake arrangement, a wheel and axle assembly comprising an axle having a journal end, a journal box therefor, and a wheel fitted on said axle, a brake disc mounted on said wheel, a yoke mounted on said journal box and comprising a flat horizontal lug, friction shoes positioned at opposite sides of said disc, actuating means for said shoes, and a support for said shoes and said means comprising a cylinder housing having a torque arm with a flat horizontal lug thereon overlying said first-mentioned lug, and a resilient connection between said lugs.

8. In a brake arrangement, a frame member, a supporting wheel and axle assembly comprising an axle having a journal end, a journal box therefor, and a wheel fitted on said axle and comprising a hub, a brake disc secured to said hub, brake shoes positioned at opposite sides of said disc, and a support for said shoes nonconcentric with respect to said assembly and comprising a bracket secured to said frame, a yoke mounted on said journal box, and operating means connected to said braket and said yoke and having an operative connection with said shoes.

9. In a brake arrangement, a frame member, a supporting wheel and axle assembly comprising an axle having a journal end, and a wheel fitted on said axle, a journal box receiving said journal end, a brake disc secured to said wheel, brake shoes positioned at opposite sides of said disc, and a support for said shoes nonconcentric with respect to said assembly and comprising a bracket secured to said frame, a yoke mounted on said journal box, and operating means supported from said bracket and said yoke, and having an operative connection with said shoes.

10. In a brake arrangement, a frame member, a supporting wheel and axle assembly comprising an axle having a journal end, a journal box therefor, and a wheel fitted on said axle, rotatable braking means secured to said wheel, brake shoes positioned at opposite sides of said means, and a support for said shoes nonconcentric with respect to said assembly and com-

prising a bracket secured to said frame, a yoke mounted on said journal box, and operating means resiliently connected to said bracket and said yoke and having an operative connection with said shoes.

11. In a brake arrangement, a wheel and axle assembly comprising an axle having a journal end, a journal box therefor, and a wheel fitted on said axle, a brake disc mounted on said wheel, a yoke mounted on said journal box and comprising a lug thereon, shoes positioned at opposite sides of said disc, actuating means associated with said shoes, and a support for said shoes and said means comprising a cylinder housing having a torque arm with a lug thereon and means connecting said lugs to each other.

12. In a brake arrangement, a wheel and axle assembly comprising an axle having a journal end, a journal box therefor, and a wheel fitted on said axle, rotatable braking means mounted on said wheel, a yoke mounted on said journal box and comprising engaging means, shoes positioned at opposite sides of said rotatable braking means, actuating means associated with said shoes, and a support for said shoes and said actuating means comprising a housing having torque transmitting means engaged with said engaging means.

13. In a brake arrangement, a wheel and axle assembly comprising an axle and a member rotatable therewith, said axle having a journal end, a journal box therefor, a yoke mounted on said journal box and comprising engaging means, shoes positioned at opposite sides of said member, actuating means associated with said shoes, and a support for said shoes and said actuating means comprising a member having torque transmitting means connected to said engaging means.

14. In a brake arrangement, a frame comprising side members, spaced supporting wheel and axle assemblies each comprising an axle having journal ends, journal means associated with said ends, yokes mounted on said journal means, wheels fitted on said axle, a disc secured to each wheel, friction shoes associated with each disc, operating means associated with said shoes, said operating means being connected to the associated yoke, and pedestal legs on said side members in guiding relationship with said yokes.

15. In a brake arrangement, a frame member, a supporting wheel and axle assembly comprising an axle having a journal end, a journal box therefor, and a wheel fitted on said axle, a brake disc secured to said wheel, brake shoes formed and arranged for frictional engagement with said disc, and a support for said shoes nonconcentric with respect to said assembly and comprising a bracket secured to said frame, a yoke mounted on said journal box, and operating means connected to said shoes, said bracket and said yoke.

16. In a brake arrangement, a wheel and axle assembly comprising an axle having a journal end, a journal box therefor, and a wheel fitted on said axle, rotatable braking means supported from said wheel, supporting means mounted on said journal box, friction shoes formed and arranged for frictional engagement with said braking means, and actuating means for said shoes, said shoes and said actuating means being resiliently connected to said supporting means, said resilient connection being nonconcentric with respect to said assembly whereby said friction shoes are afforded a washing action with respect to said braking means.

17. In a brake arrangement, a wheel and axle assembly comprising an axle having a journal end, a journal box therefor, and a wheel fitted on said axle, a rotor supported from said wheel, yoke means mounted on said journal box, friction shoes positioned at opposite sides of said rotor, and actuating means associated with said shoes, said actuating means being movably connected to said yoke means at a point lying substantially in a horizontal plane passing through the axis of said assembly.

18. In a brake arrangement, a wheel and axle assembly comprising an axle with a journal end and a wheel fitted on said axle, journal means associated with said end, a rotor secured to said wheel, friction means formed and arranged for frictional engagement with said rotor, actuating means for said friction means, and rigid means movably connecting said actuating means to said journal means at a point nonconcentric with respect to said assembly.

19. In a brake arrangement, a wheel and axle assembly comprising an axle with a journal end and a wheel fitted on said axle, journal means associated with said journal end, rotatable braking means mounted on said wheel, friction means formed and arranged for frictional engagement with said braking means, actuating means for said friction means, and a resilient connection between said actuating means and said journal means, said resilient connection being nonconcentric with respect to said assembly.

20. In a brake arrangement for a railway car truck, a truck frame, a supporting wheel and axle assembly including an axle and a member rotatable therewith, friction means for braking inboard and outboard surfaces on said member, and a support for said means comprising a member movably connected to said assembly at one end only thereof, and a torque connection between said last-named member and said frame, said first-mentioned connection being eccentric with respect to said assembly.

21. In a brake arrangement for a railway car truck, a truck frame, a supporting wheel and axle assembly including an axle and a member rotatable therewith, journal means associated with the ends of said assembly, friction means for braking inboard and outboard surfaces on said member, and a support for said friction means, said support comprising a yoke on the adjacent of said journal means, and a member connected to said yoke and to said frame.

22. In a brake arrangement, a frame member, a supporting wheel and axle assembly comprising an axle having a journal end, a journal box therefor, and a wheel on said axle, a rotor driven by said assembly, friction means formed and arranged for frictional engagement with said rotor, and a nonconcentric support with respect to said assembly for said friction means comprising support means on said frame member, a yoke mounted on said journal box, and operating means connected to said friction means, said support means, and said yoke.

23. In a brake arrangement for a railway car truck, spaced supporting wheel and axle assemblies, journal means associated with the ends thereof, equalizing means at each side of the truck comprising an equalizer with members upstanding from opposite ends thereof, said members being supported from the associated journal means, resilient means on said equalizer, a truck frame supported from said resilient means, a

brake rotor driven by each assembly, friction means associated with said rotor, a support member for said friction means, and a support for said last-named member constituting means connecting the same to the adjacent upstanding member, and a connection between said frame and said support member.

24. In a brake arrangement for a wheel and axle assembly including an axle and a member rotatable therewith, spaced journal means for respective ends of said assembly, a yoke mounted on at least one of said journal means, friction means for engagement with said member, and a support for said friction means comprising a member connected to said yoke at one side of said axle, and torque means for preventing excessive movement of said member with respect to said assembly.

25. In a brake arrangement for a railway car truck, spaced wheel and axle assemblies, journal means at the ends thereof, an equalizer at each side of the truck having a central portion and portions upstanding therefrom at opposite ends thereof for support from the associated journal means, resilient means on said central portion, a truck frame supported from said resilient means, a brake surface on each assembly, friction means for engaging said surface, and a support for said friction means comprising a member supported from the adjacent of said upstanding portions, and a torque connection between said member and said frame.

26. In a brake arrangement, a frame comprising side members, spaced supporting wheel and axle assemblies each comprising an axle and members rotatable therewith, journal means associated with the ends of said axle, yokes mounted on said journal means, friction shoes associated with each of said members, operating means associated with said shoes, said operating means being connected to the associated yokes, and pedestal legs on said side members in guiding relationship with said yokes.

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