Sept. 8, 1959 C. E. TACK ET AL 2,903,095

ROTOR BRAKE

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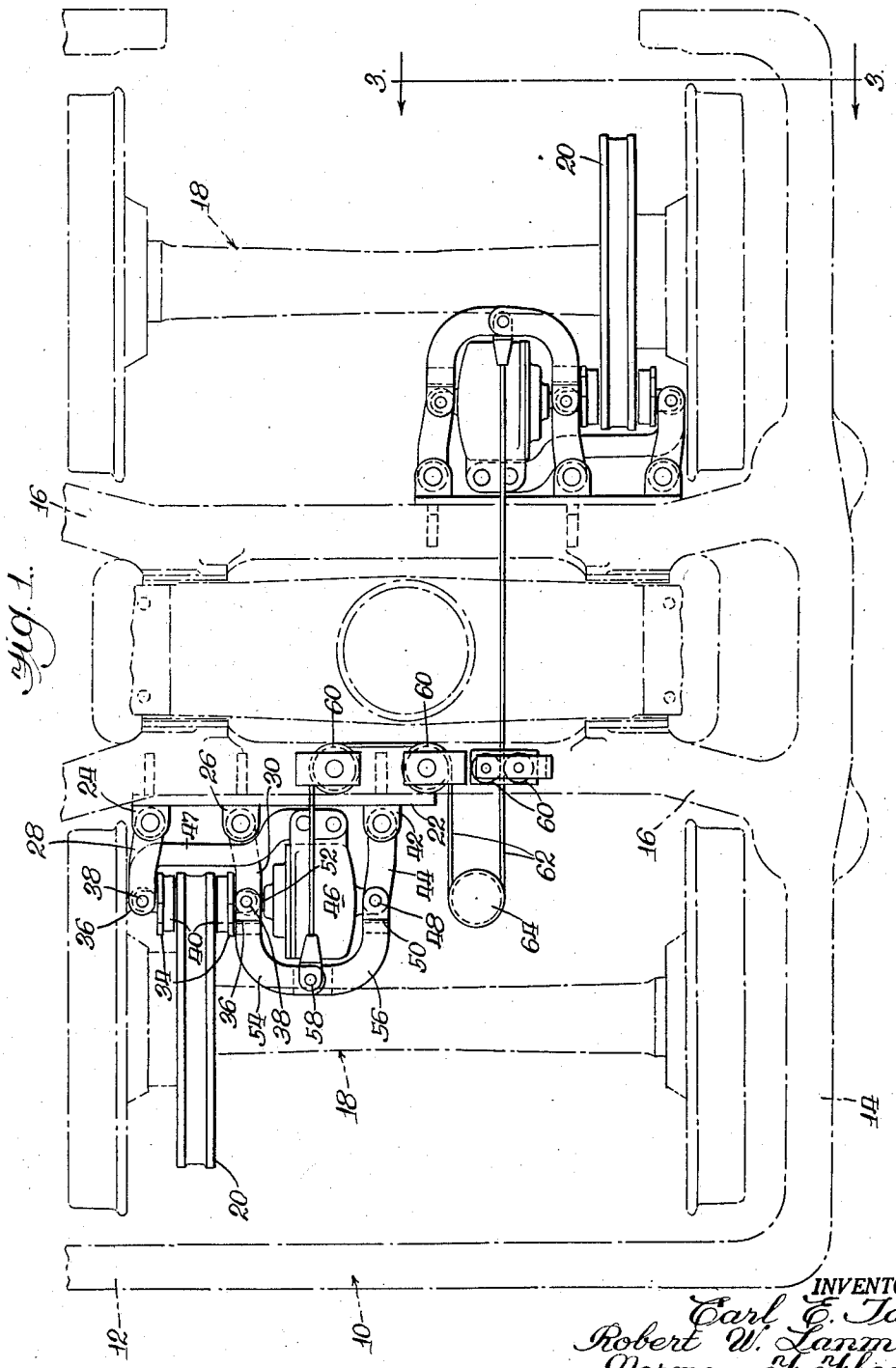


Fig. 1.

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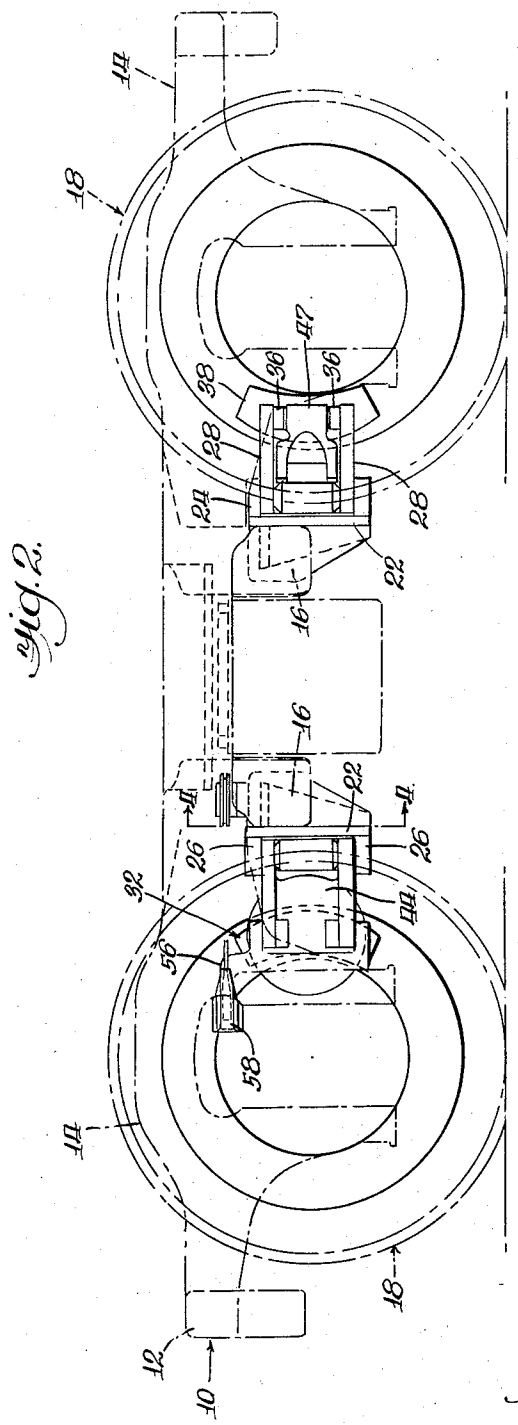


Fig. 2.

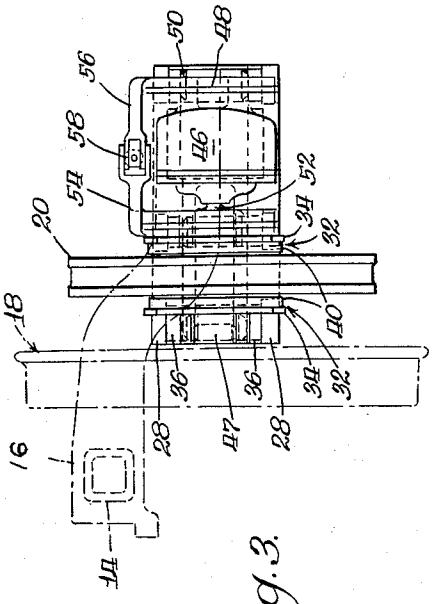


Fig. 3.

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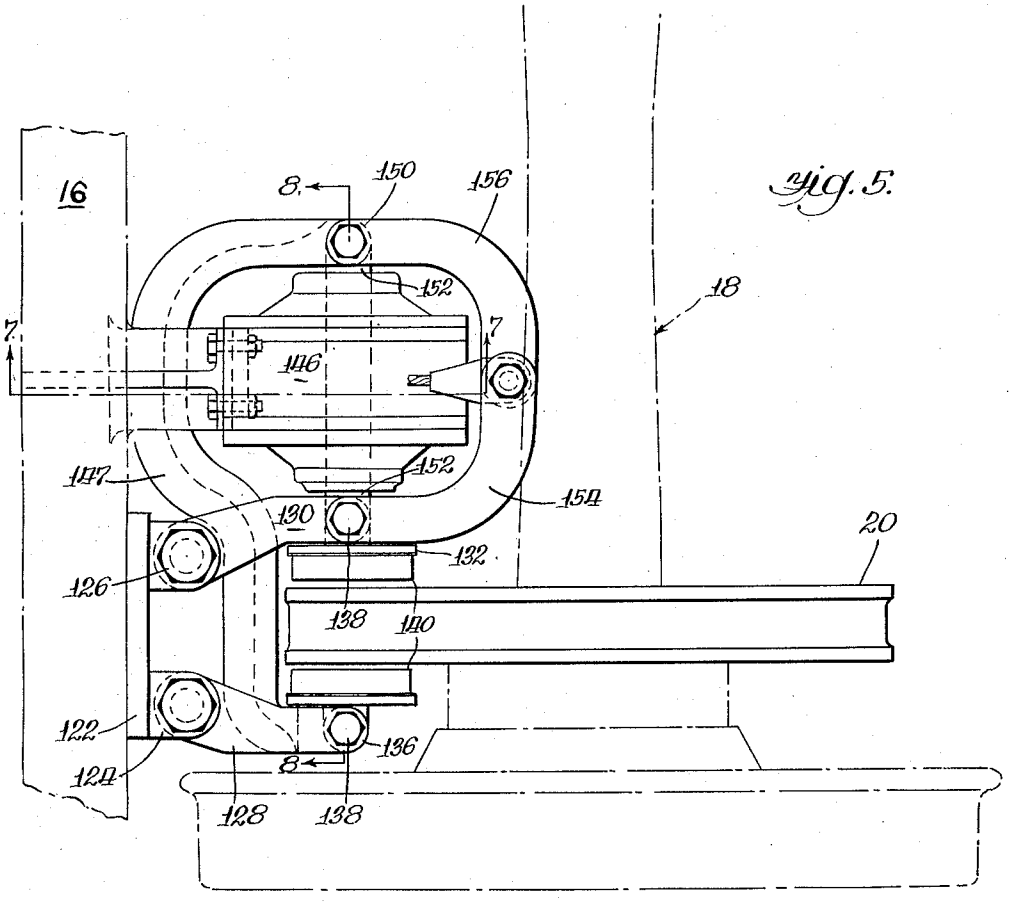


Fig. 5.

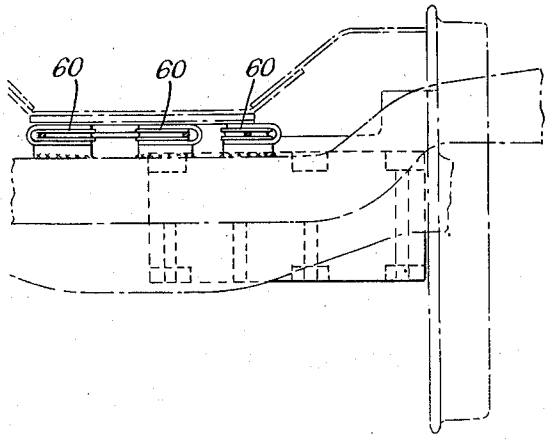


Fig. 4.

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Fig. 8.

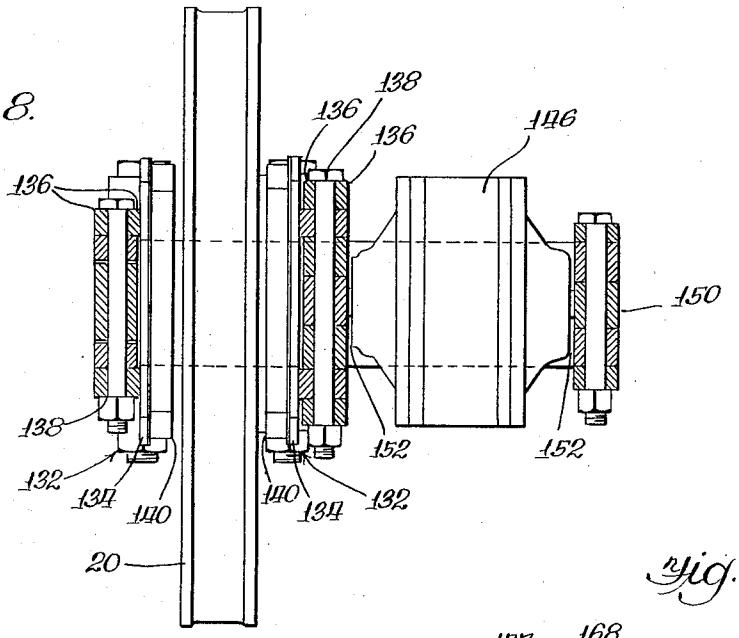


Fig. 7.

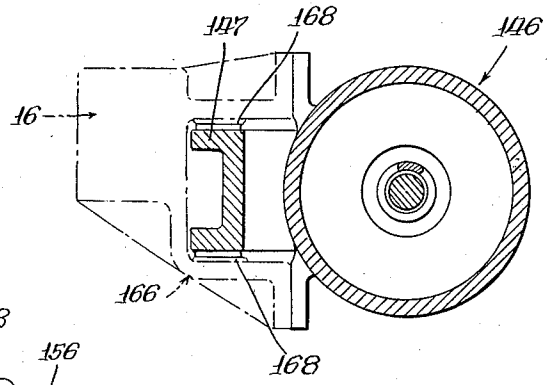
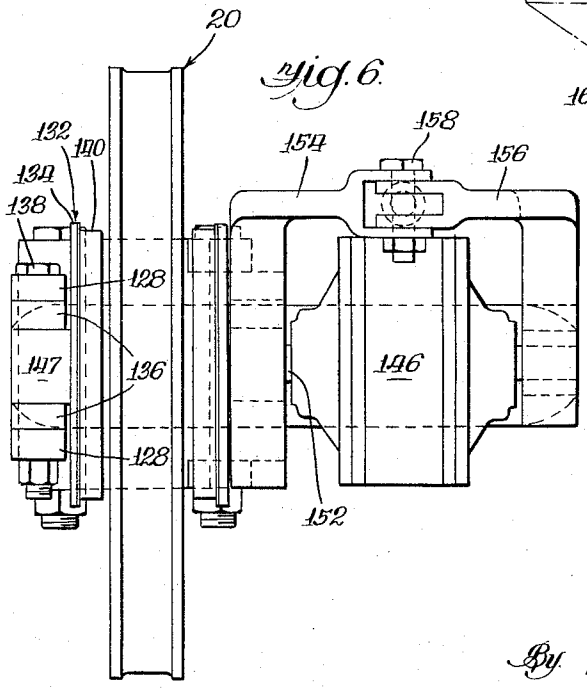


Fig. 6.



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ROTOR BRAKE

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Application September 17, 1954, Serial No. 456,703

10 Claims. (Cl. 188—59)

This invention relates to a brake arrangement for a railway car truck and more particularly to one wherein an off-wheel, or rotor brake, is employed.

One object of this invention it to provide an improved brake arrangement with a more efficient linkage system interconnecting a power source and brake applying shoes. Additionally, this invention comprehends a novel linkage that will permit the use of either a single or a duplex power cylinder.

Another specific object of this invention is to provide an arrangement wherein a power cylinder is disposed adjacent the friction rotor with its operating axis parallel to the horizontal axis of the wheel and axle assembly, and approximately perpendicular to the surfaces of the brake rotor.

A further specific object is to provide an arrangement wherein both the action and the reaction of a single acting power cylinder are employed to actuate the brake heads.

Another specific object is to utilize the novel power linkage in connection with a hand brake arrangement.

These and other objects of the invention will become apparent from an examination of the following specification and the attached drawings, wherein:

Figure 1 is a fragmentary top plan view of a railway car truck embodying the invention;

Figure 2 is a side elevational view of the structure shown in Figure 1;

Figure 3 is a fragmentary elevational view of the structure taken along line 3—3 of Figure 1;

Figure 4 is a fragmentary elevational sectional view taken along line 4—4 of Figure 2;

Figure 5 is a fragmentary top plan view of one quadrant of a railway car truck embodying a modification of the invention;

Figure 6 is a fragmentary end elevational view of the structure shown in Figure 5 and taken from the right side thereof;

Figure 7 is a fragmentary sectional view taken along line 7—7 of Figure 5 to illustrate the mounting arrangement only;

Figure 8 is a fragmentary partially sectional view of the structure taken along line 8—8 of Figure 5.

Describing the invention in detail, a truck frame 10, as seen in Figure 1, comprises end rails 12, 12, side rails 14, 14 (one of which is not shown) and transoms 16, 16. The frame 10 may be spring supported (conventional support structure not shown) by wheel and axle assemblies 18, 18. A rotor or disk 20 is preferably rigidly secured to each assembly to rotate therewith.

Mounted in a horizontal position on the side of each transom 16 adjacent the respective wheel and axle assembly is a bracket 22. Mounted on said bracket and disposed approximately adjacent the rotor are two pairs of vertically spaced lugs 24 and 26 spaced from each other, the outboard pair being designated at 24 and the other pair being designated at 26. Pivotally carried by the respective pairs of lugs 24 and 26 are brake links or arms 28 and 30.

Brake head assemblies 32, 32 are carried at the other ends of the brake links and said brake head assemblies are disposed on opposed sides of the rotor 20 in such a position as to be engageable therewith. Each of the said brake head assemblies includes a brake head 34, a brake head lug 36, a brake head pivot 38, and a brake shoe 40.

Also mounted on bracket 22, spaced inboardly of the lugs 26, is a third pair of vertically spaced lugs designated 42. Pivotally carried by said pair of lugs is support arm or link 44 which movably carries at the other end thereof, a single acting power cylinder 46, said arm having pivotal connection 48 with said cylinder at cylinder lug 50. The cylinder has a piston 52 at the other end thereof and a truck connection between the piston and the inboard brake head assembly lug 36, at pivot 38, said pivot also being common to brake link 30. A pull arm 47 is connected at one end thereof to one side of the cylinder and at the other end thereof to the outboard brake head assembly lug 36 at pivot 38, said pivot also being common to brake link 28. Additionally, a hand brake arrangement is employed, said hand brake arrangement comprising hand brake arms 54 and 56, the ends of the respective arms which are adjacent the wheel and axle assembly are interconnected by pivot 58. The other end of the arm 54 is connected to brake link 30, piston 52 and the inboard brake assembly lug 36 at pivot 38, and the other end of brake arm 56 is connected to cylinder lug 50 and support arm 44 by pivot 48. Two pairs of pulley guides 60 are mounted on the top surface of transom 16. A cable 62 connected at one end thereof to hand brake arms 54 and 56 at pivot 58 and passing around and through pulley guides 60 is connected at the other end thereof to spindle 64, said spindle being mounted above the truck and associated with conventional manual actuating mechanism.

Attention is now directed to Figures 5, 6, 7 and 8, wherein is illustrated a modified embodiment of the invention. In this embodiment, the wheel and axle assemblies 18, 18 (only one of which is shown, the other being similar), the frame 10, the transom 16 and the rotor 20 are substantially identical with those of the previous embodiment; these and other identical features being indicated by the numerals employed in the previous embodiment.

Mounted in a horizontal position on the side of each transom 16 (only one transom being shown in Figure 5) adjacent the wheel and axle assembly is a bracket 122. Mounted on said bracket and disposed approximately adjacent the rotor 20 are two pairs of vertically spaced lugs 124 and 126 spaced from each other. The outboard pair may be designated 124 and inboard pair 126. Pivotally carried by the lugs 124 and 126, respectively, are brake links 128 and 130. Brake head assemblies 132, 132 are carried by the brake links at the opposite ends thereof, and said assemblies are disposed on opposed sides of the rotor 20 in such a position as to be engageable therewith. Each of the said brake head assemblies include a brake head 134, a brake head lug 136, a brake head pivot 138 and a brake shoe 140. Spaced inboardly from the bracket 122 and cast integrally with the side of the transom 16 adjacent the wheel and axle assembly is a cylinder bracket 166 having vertically spaced arms and an opening between said arms. Within the opening and disposed on the adjacent surfaces of said arms are guides 168 (constructed of conventional bearing material) between which passes pull arm 147.

Mounted to said bracket 166 is a duplex power cylinder 146 having at each end thereof cylinder pistons 152, 152. The outboard piston 152 of said cylinder is directly connected to the adjacent inboard brake head assembly lug 136 at pivot 138, said pivotal connection also

being common to the inboard brake link **130**. The inboard piston **152** is connected to one end of a pull arm **147**, the other end of said arm being pivotally connected to the outboard brake head assembly lug **136** at pivot **138**, said pivotal connection also being common to outboard brake link **128**. Additionally, the embodiment comprises a hand brake arrangement identical with that described in the previous embodiment and illustrated in Figure 1.

To briefly describe the operation of the first embodiment, it will be noted that as the piston **52** of cylinder **46** moves, it carries inboard brake head assembly **32** in an outboard direction to a position of engagement with the rotor **20**. Almost simultaneous with this action of the piston in an outboard direction occurs the reaction of the cylinder itself in an inboard direction. As the cylinder moves inboardly, it carries pull arm **47** which, in turn, pulls outboard brake head assembly **32** in an inboard direction to a position of engagement with the rotor **20**.

In the operation of the second embodiment of the invention, the action is almost the same as that described above. The difference being that in the second embodiment, the cylinder is secured to the frame and its two pistons **152** moving in opposite directions move the respective brake head assemblies. The outboard piston pushing the inboard assembly against the rotor, and the inboard piston, actuating the pull arm, which in turn pulls the outboard assembly against the rotors.

In both embodiments the operations of the hand brake mechanisms are the same.

As the spindle **64** is actuated by outside means (as illustrated in Figure 1), the cable is pulled and in turn pulls the ends of the hand brake arms **54** and **56** causing them to pivot about pivot, **58**, so that the other ends of the hand brake arms move associated brake links which carry the respective brake head assemblies into positions of engagement with the rotor in the same manner that the brake links are actuated by the power cylinder.

We claim:

1. In a railway car truck, a wheel and axle assembly, a frame supported thereby, a friction rotor rigidly secured to said assembly and rotatable therewith, a combination power and manual brake arrangement; said power arrangement comprising brake head assemblies associated with and adjacent to opposite sides of said rotor, brake links movably carried by said frame and supporting said assemblies, a power cylinder rigidly secured to the frame and having its operating axis parallel to the horizontal axis of said wheel and axle assembly and intersecting said brake head assemblies, said cylinder comprising pistons and related piston rods, linkage means operatively connecting the cylinder to said brake links, said linkage means comprising a direct pivotal connection between one of said brake links and one of the piston rods, and a pull arm pivotally interconnecting another of said piston rods to another of said brake links; said manual brake arrangement comprising a pair of hand brake arms, each of said arms having one end thereof pivotally connected to a related piston rod, a common pivotal connection interconnecting the other ends of said arms, a pulley cable connected to said arms at said common pivotal connection, pulley guides disposed on the frame around or through which said cable is directed, and a pulley spindle to which said cables are attached.

2. In a truck arrangement, a wheel and axle assembly, a frame supported thereby, a friction member having friction surfaces on opposed sides thereof said friction member being affixed to said assembly and rotatable therewith, brake head assemblies disposed on either side of said friction member and engageable therewith, brake links pivotally mounted on said frame and carrying said assemblies, a power cylinder carried by said frame, said cylinder being disposed adjacent to and inboardly of said friction member, said cylinder having its operating axis approximately perpendicular to the friction surfaces of said member, said cylinder having portions thereof movable parallel to said perpendicular direction, a common pivotal connection interconnecting one of said portions, an adjoining brake head assembly, and a related brake link, a pull arm operatively connected at one end thereof to another of said cylinder portions, said pull arm having at the other end thereof a pivotal connection with another of said brake head assemblies and a related brake link and hand brake means said means comprising hand brake arms having corresponding ends directly pivotally secured to said portions, said arms having their other ends pivotally interconnected, a cable connected to said arms at said pivotal interconnection, pulley guides disposed on the frame, and a pulley spindle secured to said cable.

3. In a brake arrangement, a wheel and axle assembly, a frame supported thereby, a brake rotor having friction surfaces on opposite sides thereof, brake shoe assemblies disposed adjacent to and engageable with said friction surfaces, brake links pivotally carried by said frame and supporting said shoe assemblies, a power cylinder carried by said frame, said power cylinder being disposed between said frame and wheel and axle assembly and inboardly of said rotor, said cylinder having its operating axis parallel to the horizontal axis of said wheel and axle assembly and in horizontal alignment with the brake shoe assemblies, said cylinder comprising members movable toward and away from said rotor, linkage connecting said cylinder to the related shoe assemblies and links, said linkage comprising a pivotal connection connecting a movable member of the cylinder and an adjacent shoe assembly, a pull arm operatively interconnecting another cylinder member and the remote shoe assembly, and a hand brake system comprising two hand brake arms, one of said arms having one end thereof pivotally connected to one of said movable members, the other of said arms having a corresponding end operatively connected to said pull arm, said arms having their corresponding opposite ends joined at a common scissor-like connection, a cable connected to said connection, pulley guides disposed on said frame, and a pulley spindle to which the ends of said cables are connected.

4. In a brake arrangement for a wheel and axle assembly, a frame supported thereby, a friction member having friction surfaces on opposite sides thereof, said member being affixed to said assembly and rotatable therewith, brake head assemblies disposed on either side of said member and engageable therewith, brake links pivotally secured to said frame and carrying said assemblies, a power cylinder having a piston and piston rod, said cylinder being carried by the frame adjacent to and inboardly of said member, said cylinder having its operating axis perpendicular to the friction surfaces of said member, a direct pivotal connection connecting said piston rod to one of said brake head assemblies, and its related brake link, a pull arm having at one end thereof a direct pivotal connection to the power cylinder, said pull arm having at the other end thereof a direct connection with the other brake head assembly and its related brake link.

5. In a railway car truck brake arrangement, a wheel and axle assembly, a frame supported thereby, a brake rotor having friction surfaces on opposite sides, said rotor being rigidly secured to and rotatable with said assembly, brake shoe assemblies disposed on opposite sides of said rotor and engageable with said surfaces, brake links pivotally carried by said frame and supporting said shoe assemblies, a power cylinder secured to the frame inboardly of said rotor, said power cylinder comprising a pair of pistons and piston rods, movable toward and away from said rotor, said cylinder being disposed with its longitudinal operational axis parallel to the horizon-

tal axis of said wheel and axle assembly and in approximately perpendicular alignment with the friction surfaces of said rotor, and cooperative linkage connecting the power cylinder to the brake links, said linkage comprising a pivotal connection connecting the inboard brake link, the related brake shoe and an adjacent piston rod, and a floating pull arm directly connected at one end to the outboard brake link and its related brake shoe assembly, said pull arm being pivotally connected at its other end to its adjacent piston rod.

6. In a brake arrangement, a wheel and axle assembly, a frame supported thereby, a brake rotor having friction surfaces on opposite sides thereof, said rotor being secured to said assembly and rotatable therewith, friction shoe assemblies engageable with said friction surfaces, brake links movably mounted on said frame and carrying related shoe assemblies, a power cylinder rigidly secured to the frame inboardly of said rotor, said cylinder having pistons and piston rods, the longitudinal axes of the rods being disposed perpendicular to the friction surfaces of the rotor, said axes intersecting said shoe assemblies, a release spring assembly within said cylinder for reversing the operating action of said pistons and their related rods, a pull arm having its opposite ends directly connected to one of said piston rods and one of said shoe assemblies, and a movable connection connecting another of said piston rods and another of said shoe assemblies.

7. In a brake arrangement, a wheel and axle assembly, a frame supported thereby, a brake rotor secured to said assembly and rotatable therewith, brake shoe assemblies associated with said rotor on opposite sides thereof, brake links movably mounted to said frame and carrying said shoe assemblies, a power cylinder movably carried by said frame and disposed inboardly of said rotor, said cylinder having a piston and a rod, said rod extending towards said rotor, said cylinder having its operating axis parallel to the horizontal axis of the wheel and axle assembly, and linkage means connecting the cylinder to the shoe assemblies, said means comprising a pivotal connection at the end of the rod directly connecting the rod and the inboard shoe assembly, and a pull arm having one end thereof rigidly connected to the cylinder, the other end of said pull arm being directly pivotally connected to the outboard shoe assembly.

8. In a railway car truck brake arrangement, a wheel and axle assembly, a frame supported thereby, a friction rotor affixed to said assembly and rotatable therewith, brake shoe assemblies on either side of said rotor, brake links carried by said frame and supporting said brake shoe assemblies, a duplex power cylinder assembly, said power cylinder assembly comprising dual pistons and rods, said cylinder assembly having its operating axis parallel to the horizontal axis of said wheel and axle assembly, said operating axis intersecting said shoe assemblies, and linkage means interconnecting said cylinder and said shoe assemblies, said means comprising a movable connection connecting one power cylinder piston rod and an adjacent brake shoe assembly and its related brake link, and a pull arm having one end directly connected to another piston rod and movable therewith, the other end of said pull arm being directly connected to the remote brake head assembly and its related brake link for actuation thereof.

9. In a brake arrangement for a railway car truck, a friction member, movable friction means disposed on opposite sides of said member and arranged to clasp said member, power means, an operative connection connecting the power means and one of said friction means, an arm, a direct connection connecting one end of said arm to said power means, another direct connection connecting the other end of said arm to said other friction means, said arm being arranged to urge its related friction means to engage said member in response to the engagement of the first mentioned friction means with the member, said first mentioned friction means being engageable with the member in response to the action of the power means.

10. A brake arrangement according to claim 8, and additionally comprising a hand brake assembly, said assembly comprising arms each pivotally secured to one of said piston rods, a common movable connection interconnecting said arms, a cable means connected to said arms at said movable connection, pulley guides disposed on the frame through which the cable means pass, and a pulley spindle secured to said cable.

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