Nov. 29, 1938. E. E. VAN CLEAVE ET AL 2,138,263

HYDRAULIC BRAKE FOR RAILWAY CARS

Filed July 16, 1936 3 Sheets-Sheet 1

Fig. 1

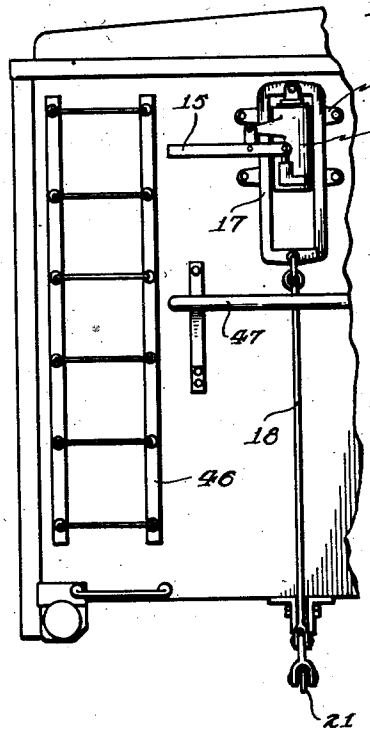


Fig. 2

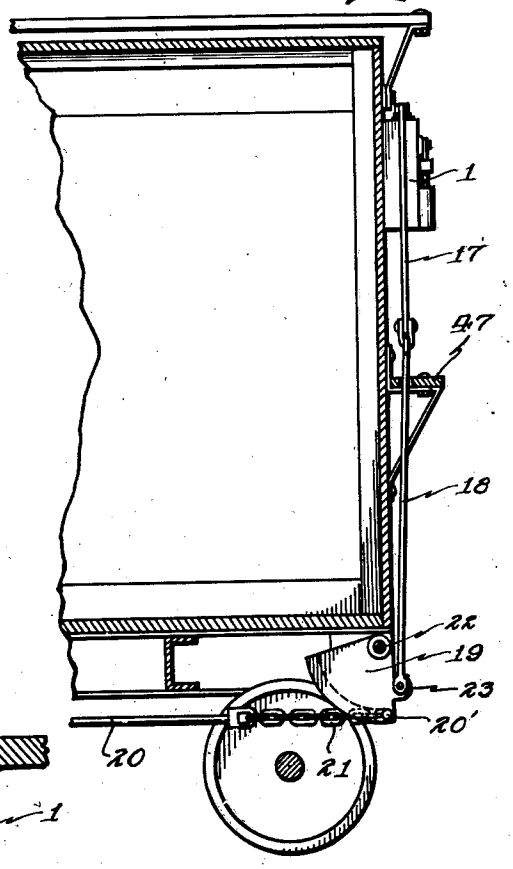
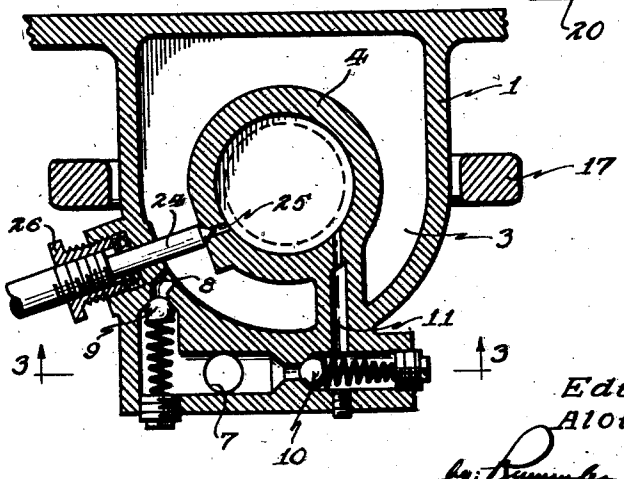


Fig. 5



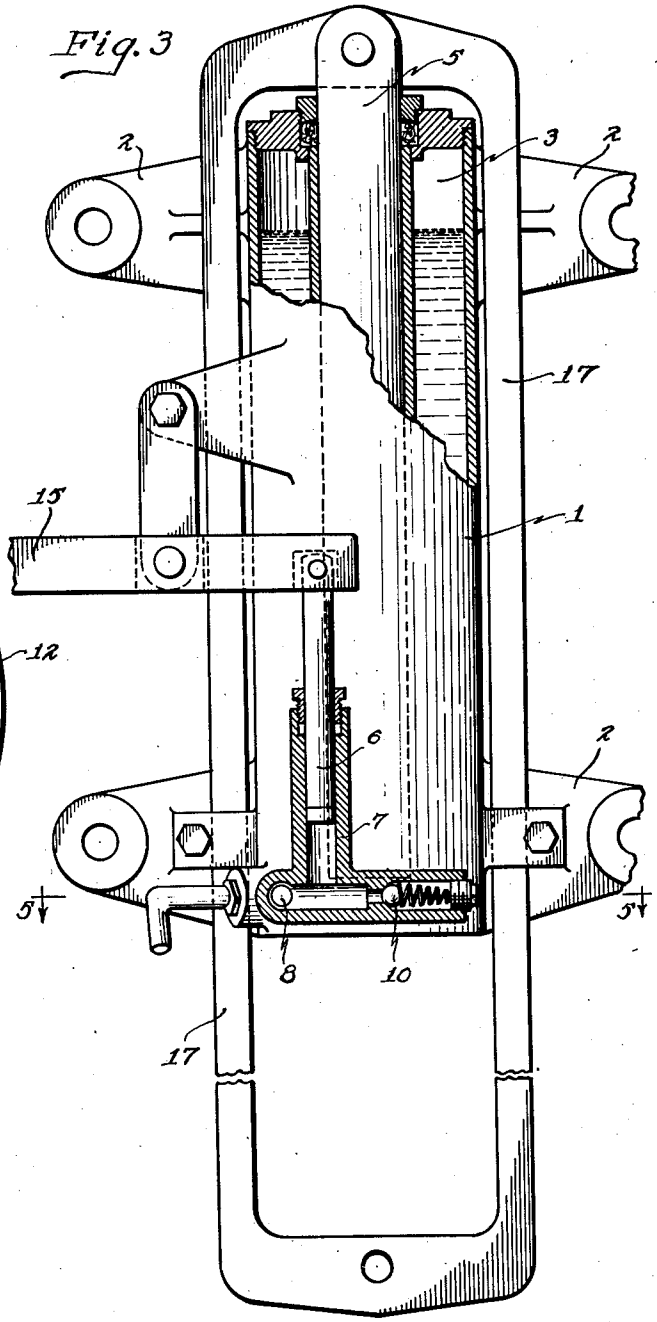
Inventors
Edwin E. Van Cleave
Alois Wiedenbauer
by: Rummler Rummler & Woodworth
Attys.

Nov. 29, 1938. E. E. VAN CLEAVE ET AL 2,138,263

HYDRAULIC BRAKE FOR RAILWAY CARS

Filed July 16, 1936 3 Sheets-Sheet 2

Fig. 3



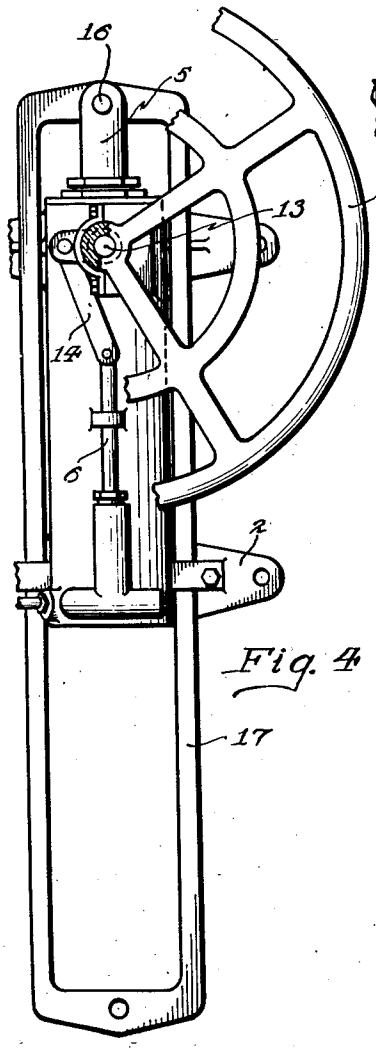


Fig. 4

Inventors
Edwin E. Van Cleave
Alois Wiedenbauer
by Lemmler Lemmler & Woodworth
their Attys.

Nov. 29, 1938. E. E. VAN CLEAVE ET AL 2,138,263

HYDRAULIC BRAKE FOR RAILWAY CARS

Filed July 16, 1936 3 Sheets-Sheet 3

Fig. 6

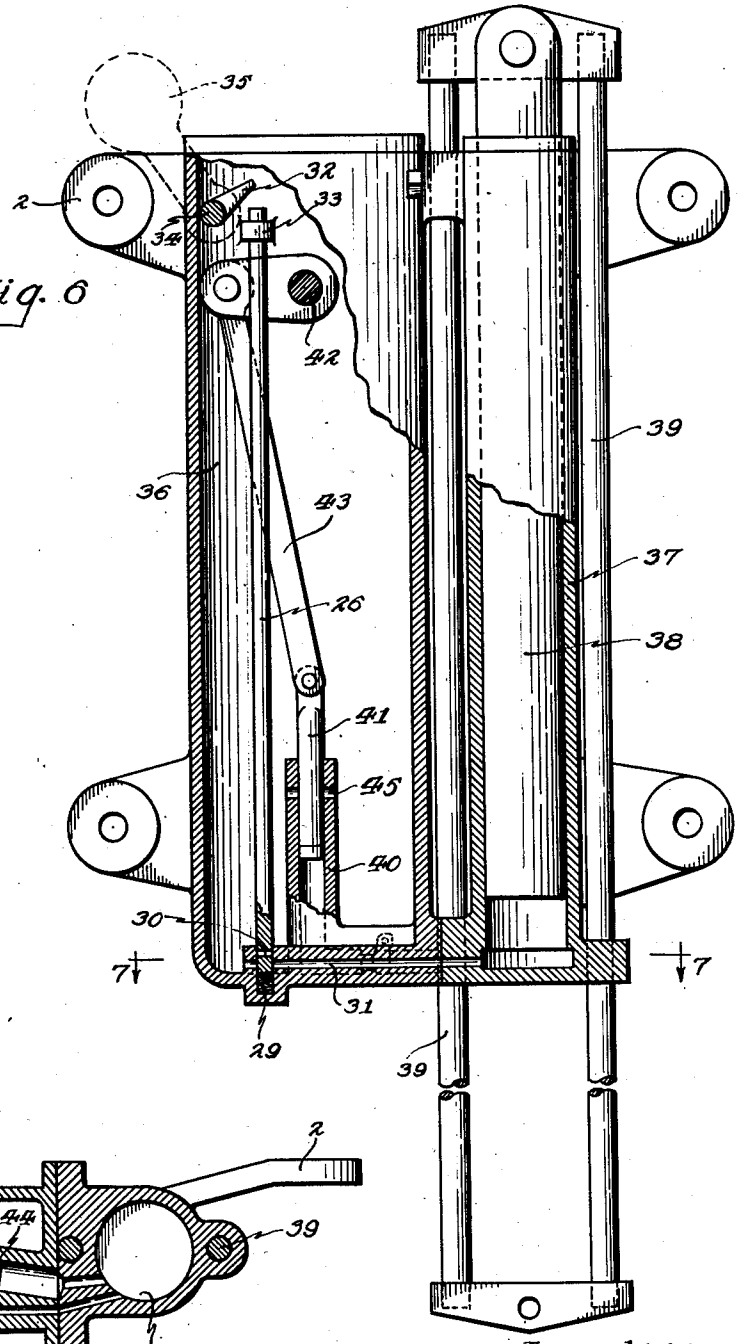
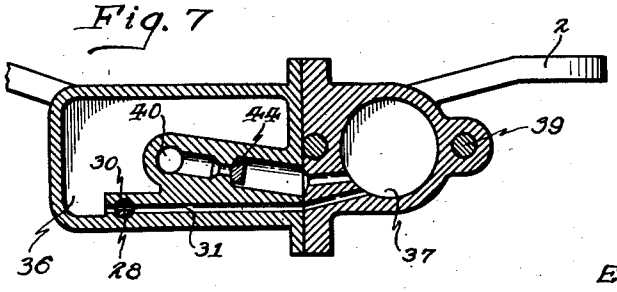


Fig. 7



Inventors
Edwin E. Van Cleave
Alois Wiedenbauer
by Lemmler Lemmler & Woodworth
their Attys.

Patented Nov. 29, 1938 2,138,263

UNITED STATES PATENT OFFICE

2,138,263

HYDRAULIC BRAKE FOR RAILWAY CARS

Edwin E. Van Cleave and Alois Wiedenbauer,
Chicago, Ill.

Application July 16, 1936, Serial No. 90,935

5 Claims. (Cl. 188—153)

This invention relates to brake operating means of the character which is individual to each railway car in addition to the usual air braking system general to a train.

The individual car braking means is now fairly well standardized, particularly in freight cars, to a hand-operated mechanical means for transmitting thrust to the brake shoes.

The purposes of the present invention are to provide a fluid pump unit suitable for using oil in place of gears for transmitting power from the handwheel to the mechanical brake applying means. This construction is designed to occupy approximately the same space, and location, and to utilize the same attachment means as are standard with the purely mechanical constructions now generally in use. The new arrangement allows for an improved action particularly with reference to a partial release of the brakes without undue physical exertion to maintain the required pressure of the brake shoes on the wheels. This hydraulic handwheel unit is applicable to all classes of railway cars and the pump thereof may be operated either by a lever or customary handwheel, and from this unit to the brakes the mechanical power transmitting means may be the same as usual without modification thereof. Thus the only change required to install the improved operating unit is to substitute it for the usual handwheel and reduction gearing and sheave to which is attached the lift chain by means of which power is transmitted to the brake levers.

In place of a mechanically operated sheave the new construction has a vertically movable oil pressure operated reciprocating part, preferably in the form of a yoke to which a link is attached for connecting the yoke with the brake mechanism.

Aside from the general purpose of the invention as above mentioned the new construction provides several incidental features of improvement such as a reservoir for oil surrounding the pressure cylinder and plunger, a release valve operating means which extends above the oil level and a connection between the handwheel and a pump plunger by means of which pressure is built up in the pressure cylinder, within which fits an actuating ram for the brake mechanism.

The improved construction with a modification thereof is illustrated in the drawings, in which—

Figure 1 is an end fragmentary view of a freight car with the pump and ram unit mounted thereon.

Fig. 2 is a fragmentary longitudinal section of a freight car and shows the location of the pump and ram unit and the customary linkage between it and the brake rods.

Fig. 3 is an enlarged face view partly in section of the pump and ram unit.

Fig. 4 is a face view on a reduced scale of the construction shown in Fig. 3 but includes a handwheel partly broken away in the place of a lever for operating the pump.

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 3.

Fig. 6 is a face view partly in section of a modified form of the pump and ram unit in which instead of having the oil reservoir wholly surrounding the ram and its cylinder, the reservoir is located to one side thereof and surrounds the pump and the release valve.

Fig. 7 is a sectional detail as indicated by the line 7—7 on Fig. 6.

In order to provide a fluid pressure operating means for the individual braking systems of railway cars in place of the mechanical units performing the same function, it is desirable to have a frame structure 1 therefor with perforated ears 2 for the attaching bolts, which perforations are properly spaced to involve no change in that regard.

The frame structure 1 is formed to provide a reservoir 3 for the fluid for operating the hydraulic mechanism. This fluid as is customary in hydraulic brake mechanisms is a non-freeze solution preferably containing suitable lubricants for the pump piston and the ram or pressure responsive piston.

The reservoir 3 as shown in Figs. 3 and 5 surrounds the cylinder 4 which is an integral part of the frame structure 1 and within which fits a piston or ram 5. Fluid pressure is applied to the bottom of the piston 5 by means of a pump piston 6 fitting a pump cylinder 7. The intake of the pump cylinder 7 is indicated at 8, Fig. 5, and opens on each intake stroke of the piston when the spring pressed ball check 9 moves away from its seat. Upon the down stroke of the piston, check 9 closes and check 10 opens, permitting the passage of the fluid through the passageway 11 to the lower end of the cylinder 4, beneath piston 5. A succession of operating impulses is imparted to the piston 6 by rotating handwheel 12, Fig. 4. Handwheel 12 is secured to a crankshaft 13 which is linked to the piston 6 by the connecting rod 14. An optional way of operating piston 6, by means of a pump handle 15, is shown in Fig. 3.

The large piston 5 is shown pivoted at its upper

end at 16 to a yoke 17 which extends downwardly at each side of frame 1 to a rod 18 with which it is pivoted at its lower end in order to transmit motion to a sector sheave 19 to which the lower end of rod 18 is pivoted. Sheaves like this or bell crank levers are customarily employed in mechanical brakes of the same class for transmitting motion at right angles from the vertically movable rod 18 to the brake levers through a connecting rod 20 and a chain 21. The point of attachment 20' of chain 21 to the sheave 19 is further away from the sheave pivot 22 than the pivot 23 connecting the sheave with link 18. Thus a multiplying effect is produced so that slight motions of the piston 5 are effective for producing a relatively larger motion of link 20. To permit a restoring motion of the mechanism above described and release or partial release of the brakes a valve 24 is made use of to open a port 25 affording communication between the lower end of cylinder 1 and the reservoir 3.

In Fig. 5 the valve 24 is shown as a needle valve having threaded engagement with a packing gland 26, but to avoid the use of packing it is preferred to make use of valves of the character illustrated at 28, Fig. 6, which is a slide valve normally held in closed position by a spring 29 and having a port 30 which may be caused to register with the return passageway 31 when the valve is depressed by a pivoted arm 32. This arm is in position to engage the end of the valve stem above its bearing 33, and above the oil level to minimize the chance of leakage at the bearing for shaft 34 which carries the arm 32 and passes through the casing to a weighted handle 35. This handle may be thrown over to the right, Fig. 6, so as to hold valve 28 in its open position, or in case it is desired merely to release some of the pressure on the brakes, handle 35 is shifted over and returned to only momentarily depress valve 28.

The construction illustrated by Figs. 6 and 7 is the same in principle as that illustrated by Figs. 3 and 5, except that in the former case the valve structure is somewhat modified as explained, and the reservoir for the operating fluid as indicated at 36 is to one side of the cylinder 37 for the pressure responsive piston 38. The power transmitting yoke 39 in this arrangement may be narrower. The pump cylinder 40 in this case is located within the reservoir 36 and the pump piston 41 is connected to the handwheel crank 42 by a connecting rod 43, also within the reservoir and lubricated by the liquid therein. In this case only one check valve 44 is made use of, as the pump cylinder is filled on the upstroke of the piston through the apertures 45.

In the use of this supplementary braking means for railway cars the brakeman as usual stands on ladder 46 and footrest 47, Fig. 1, and may operate the wheel 12 or the lever 15 with one hand only, building up pressure within the cylinder 4 to that required for firmly applying the brakes and without feeling considerable back pressure, as with the mechanical brakes, and likewise upon releasing the brakes either wholly or only to a limited extent, no undue exertion on the part of the brakeman is required to resist and hold the brakes against a back thrust, as it is easy to work the release valve 26 or 24 with one hand.

We claim:

1. A hydraulic operating means for the brakes of railway freight cars and for substitution in place of the usual mechanical hand-operated means comprising a support including an end wall of a freight car and a frame attached to the outside of said wall, said frame forming a reservoir and a cylinder, a pump for forcing fluid under pressure from the reservoir to the cylinder, a plunger movable in said cylinder by the fluid pressure, brake-operating means connected with said plunger, a return flow connection between said cylinder and reservoir, a valve controlling return flow through said connection, and manually adjusted weighted operating means for controlling the positioning of said valve either open or closed.

2. A hydraulic operating means for the brakes of railway freight cars and for substitution in place of the usual mechanical hand-operated means, comprising a support including an end wall of a freight car and a frame attached to the outside of said wall, said frame forming a reservoir and a vertical cylinder, a pump for forcing fluid under pressure from the reservoir to the cylinder, said cylinder being closed at its lower end except for a return outlet to the reservoir, a valve controlling return flow through said outlet, said valve being located near the bottom of said cylinder, operating means for said valve extending upwardly through said reservoir, a plunger movable in said cylinder by the fluid pressure, and brake operating means connected with the upper end of said plunger.

3. A hydraulic operating means for the brakes of railway freight cars and for substitution in place of the usual hand-operated means, comprising a support including an end wall of a freight car and a frame attached to the outside of said wall, said frame forming a reservoir and a cylinder, a pump for forcing fluid under pressure from the reservoir to the cylinder, a plunger movable in said cylinder by the fluid pressure, brake-operating means connected with said plunger and including a yoke surrounding said cylinder and arranged to transmit thrust from said plunger in the direction of movement of the plunger.

4. A hydraulic operating means for the brakes of railway freight cars and for substitution in place of the usual mechanical hand-operated means, comprising a support including an end wall of a freight car and a frame attached to the outside of said wall, said frame having therein hydraulic operating means including coaxial vertically disposed nested elements, one of which is a ram plunger, another a ram cylinder with which the plunger fits, and another, a reservoir spaced from and surrounding the ram cylinder, said plunger having a connection at its upper end for communicating motion to brake-rigging, and manually operated means for forcing fluid from said reservoir into the bottom of the ram cylinder.

5. A hydraulic operating means for the brakes of railway freight cars and for substitution in place of the usual mechanical hand-operated means comprising a support including an end wall of a freight car and a frame attached to the outside of said wall, said frame forming a reservoir and a cylinder, a pump for forcing fluid under pressure from the reservoir to the cylinder, a plunger movable in said cylinder by the fluid pressure, brake-operating means connected with said plunger, a return flow connection between said cylinder and reservoir, a valve controlling return flow through said connection, and an operating handle having means for normally urging said valve either fully opened or fully closed, according to the disposition of said handle to one side or the other of a medial position.

EDWIN E. VAN CLEAVE.
ALOIS WIEDENBAUER.