Aug. 18, 1925. 1,550,089

C. F. MATTINGLY

HYDRAULIC BRAKE

Filed March 3, 1925

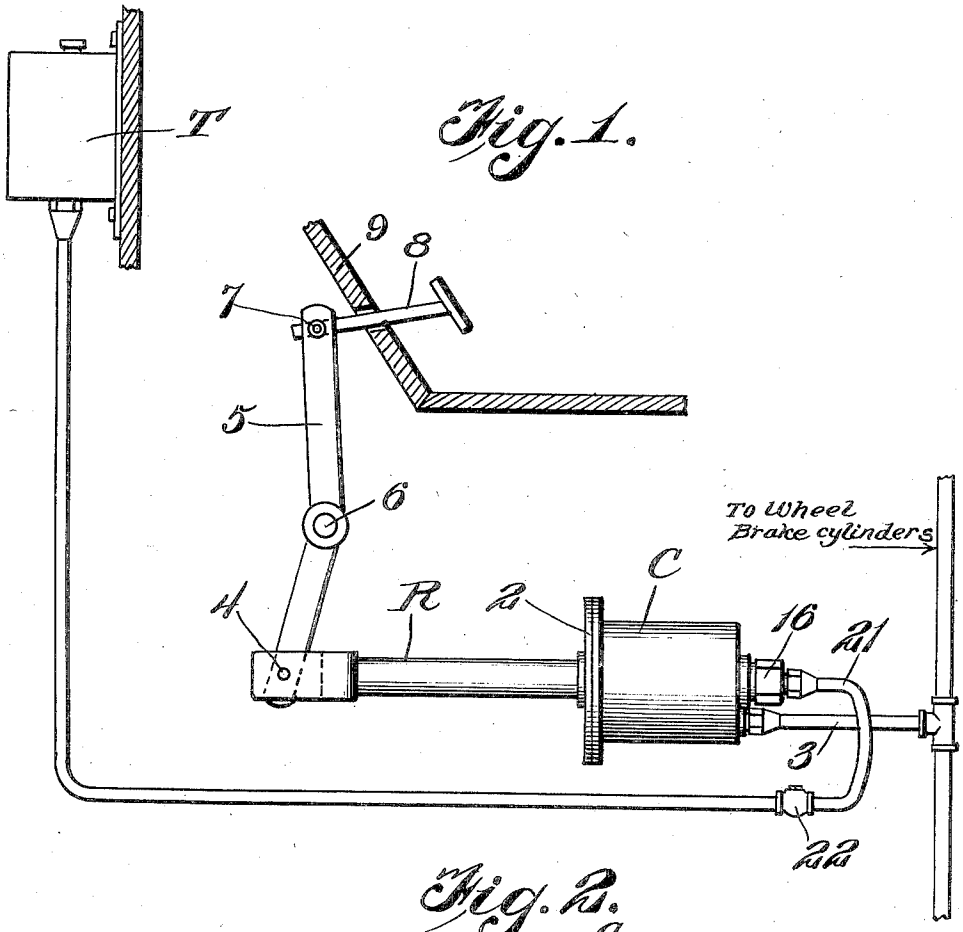


Fig. 1.

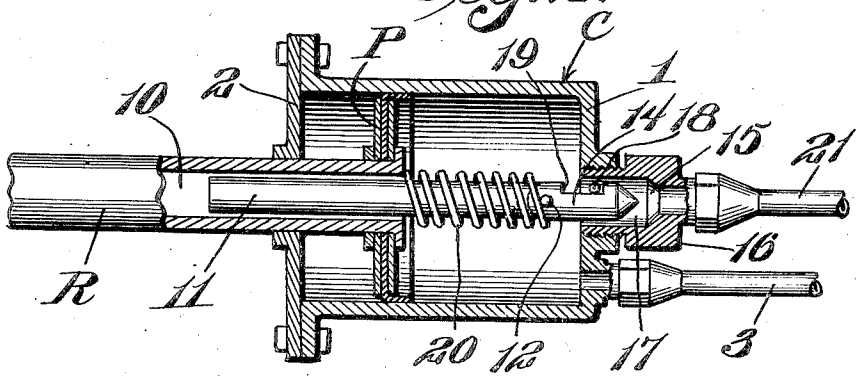


Fig. 2.

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UNITED STATES PATENT OFFICE.

CHARLES F. MATTINGLY, OF ST. LOUIS, MISSOURI, ASSIGNOR TO MATTINGLY AUTOMATIC VALVE COMPANY, INC., OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

HYDRAULIC BRAKE.

Application filed March 3, 1925. Serial No. 12,938.

To all whom it may concern:

Be it known that I, CHARLES F. MATTINGLY, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Hydraulic Brakes, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to certain improvements in hydraulic brakes and more especially to that type of brake as disclosed in my pending applications Serial No. 683,471 filed December 29, 1923, and Serial No. 699,017 filed March 13, 1924, wherein a master piston is employed for setting the brakes, and it is an object of the invention to provide novel and improved means for maintaining the cylinder of the master piston and the piping associated therewith completely charged or filled, said means operating in substantially an automatic manner.

The invention consists in the details of construction and in the combination and arrangement of the several parts of my improved hydraulic brake whereby certain important advantages are attained and the device rendered simpler, less expensive and otherwise more convenient and advantageous for use, as will be hereinafter more fully set forth.

The novel features of my invention will hereinafter be definitely claimed.

In order that my invention may be the better understood, I will now proceed to describe the same with reference to the accompanying drawings, wherein:—

Figure 1 is a fragmentary view partly in section and partly in elevation and of a diagrammatic character illustrating a supply or filling means arranged in accordance with an embodiment of my invention;

Figure 2 is an enlarged fragmentary view partly in section and partly in elevation illustrating in detail the structure directly associated with the master piston and cylinder.

As disclosed in the accompanying drawing, C denotes a master cylinder having one end closed by a permanent head 1 and its opposite end closed by the removable head 2. To one side of its axial center the cylinder C has in communication therewith through the permanent head 1 the conduit 3 leading to and having communication with brake cylinders of a hydraulic brake system of the type particularly shown in my pending applications Serial No. 683,471 filed December 29, 1923, and Serial No. 699,017 filed March 13, 1924.

Working in the cylinder C is a piston P mounted on the inserted end portion of the rod R slidably disposed through the axial center of the removable head 2. The outer end portion of the rod R is pivotally connected, as at 4, to the lower end portion of a vertically disposed arm 5. This arm 5 is supported at a predetermined point intermediate its ends, as at 6, for swinging movement and operatively engaged, as at 7, with the upper end portion of said arm 5 is a pedal 8. As herein disclosed, the pedal 8 extends above the floor board 9 of a motor driven vehicle to furnish means to apply the brakes by pressure exerted by a foot as is particularly disclosed in my pending applications hereinbefore referred to.

The inserted end portion of the rod R is provided with the bore 10 open at the inner end of the rod to permit the insertion within the rod R of the plunger rod 11. This rod 11 is of a diameter less than the diameter of the bore 10 of the rod R to allow a passageway therearound. Pivotally connected, as at 12, to the outer end portion of the plunger rod 11 is a pin valve 14 which coacts with the internal valve seat 15 provided in the bushing 16. The bushing 16 is threaded through the permanent head 1 at the axial center thereof and the valve seat 15 is in direct alignment with the bore 10 of the rod R.

The pin valve 14 is loosely received within the inner end portion of the bore 17 of the bushing 16 and held in place by a pin or lug 18 carried by the bushng 16 and extending inwardly of the bore 17. The lug 18 is received within a longitudinally disposed groove or slot 19 provided in the periphery of the pin valve 14. The valve 14 as is clearly illustrated in Figure 2 is of a diameter less than the diameter of the bore 17 of the bushing 16 whereby a passageway is provided therearound.

Surrounding the plunger rod 11 is a compression spring 20 interposed between the inserted end of the rod R and the pivot pin 12, said spring 20 serving to hold the pin valve 14 against its seat 15 while the spring 20 is compressed.

Suitably secured to the bushing 16 and in communication with its bore 17 is a pipe

line or tubing 21 which leads to and is in communication with a supply tank T positioned a desired distance above the cylinder C. Interposed in the pipe line or tubing 21 is a check valve 22 of any preferred type which allows the fluid to pass from the tank T to the cylinder C but prevents flow in the opposite direction through said line or tubing 21.

Assuming that the brake system is fully charged or full of the fluid, when the pedal 8 is depressed it will cause the piston P to be moved inward or to the right and this inward movement of the piston P causes the plunger rod 11 also to be moved inwardly with the piston P until the pin valve 14 comes against its seat 15. As the piston P continues to move inwardly as the brake is applied the plunger rod 11 is further received within the bore 10 of the rod R and this further movement of the piston P begins to force out the fluid in the bore 10 of the rod R and at the same time the spring 20 is placed under compression. In view of the foregoing it is to be understood that the first inward movement of the piston P will close the passage between the master cylinder C and the tank T and that the more the piston P is moved inwardly the tighter the pin valve 14 is forced to its seat 15.

When the brake is released, just as soon as the piston P travels back far enough to disengage the spring 20, the plunger rod 11 will move inwardly of the cylinder C until such movement is limited by the contact of the lug 18 with the outer shoulder afforded by the groove or slot 19. The piston P, however, continues its retractive movement and the plunger rod 11 operates to provide a suction within the inner portion of the bore 10 causing said bore to be again refilled with fluid.

The pin valve 14 is off its seat at all times when the brakes are in release and therefore it is during such period the fluid within the tank T will enter by gravity into the cylinder C and thereby maintain the entire system fully charged or full of fluid.

From the foregoing description it is thought to be obvious that a hydraulic brake constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that my invention is susceptible of some change and modification without departing from the principles and spirit thereof and for this reason I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice except as hereinafter claimed.

I claim:—

1. A device of the class described comprising, in combination, a cylinder, a piston working therein, a pipe line leading from the cylinder, a tank, a pipe line leading from said tank and in communication with the cylinder, a rod for the piston extending exteriorly of the cylinder, means coacting with the rod for operating the piston within the cylinder, the inserted end portion of the rod being provided with a bore open at the inner end of the rod, a plunger rod extending within the bore of the piston rod, the outer end portion of the plunger rod constituting a valve, said valve closing the flow from the tank into the cylinder when the piston is initially moved in one direction, the bore of the piston rod permitting further movement of the piston without hinderance by the plunger rod.

2. A device of the class described comprising, in combination, a cylinder, a piston working therein, a pipe line leading from the cylinder, a tank, a pipe line leading from said tank and in communication with the cylinder, a rod for the piston extending exteriorly of the cylinder, means coacting with the rod for operating the piston within the cylinder, the inserted end portion of the rod being provided with a bore open at the inner end of the rod, a plunger rod extending within the bore of the piston rod, the outer end portion of the plunger rod constituting a valve, said valve closing the flow from the tank into the cylinder when the piston is initially moved in one direction, the bore of the piston rod permitting further movement of the piston without hinderance by the plunger rod, and means for limiting the movement of the plunger rod in the opposite direction.

3. A device of the class described comprising, in combination, a cylinder, a piston working therein, a pipe line leading from the cylinder, a tank, a pipe line leading from said tank and in communication with the cylinder, a rod for the piston extending exteriorly of the cylinder, means coacting with the rod for operating the piston within the cylinder, the inserted end portion of the rod being provided with a bore open at the inner end of the rod, a plunger rod extending within the bore of the piston rod, the outer end portion of the plunger rod constituting a valve, said valve closing the flow from the tank into the cylinder when the piston is initially moved in one direction, the bore of the piston rod permitting further movement of the piston without hinderance by the plunger rod, said plunger rod being of a diameter less than the diameter of the bore of the piston rod.

4. A device of the class described comprising, in combination, a cylinder, a piston working therein, a pipe line leading from the cylinder, a tank, a pipe line leading from said tank and in communication

with the cylinder, a rod for the piston extending exteriorly of the cylinder, means coacting with the rod for operating the piston within the cylinder, the inserted end portion of the rod being provided with a bore open at the inner end of the rod, a plunger rod extending within the bore of the piston rod, the outer end portion of the plunger rod constituting a valve, said valve closing the flow from the tank into the cylinder when the piston is initially moved in one direction, the bore of the piston rod permitting further movement of the piston without hinderance by the plunger rod, and a compression spring surrounding the plunger rod and engaged therewith, said spring contacting with the inserted end portion of the piston rod upon inward movement of said rod.

5. A device of the class described comprising, in combination, a cylinder, a piston working therein, a pipe line leading from the cylinder, a tank, a pipe line leading from said tank and in communication with the cylinder, a rod for the piston extending exteriorly of the cylinder, means coacting with the rod for operating the piston within the cylinder, the inserted end portion of the rod being provided with a bore open at the inner end of the rod, a plunger rod extending within the bore of the piston rod, a pin valve pivotally connected with the outer end portion of the plunger rod, said valve closing the flow from the tank into the cylinder when the piston is initially moved in one direction, the bore of the piston rod permitting further movement of the piston without hinderance by the plunger rod.

In testimony whereof I hereunto affix my signature.

CHARLES F. MATTINGLY.