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W. H. SAUVAGE.

FLUID PRESSURE BRAKE.

APPLICATION FILED MAY 25, 1906.

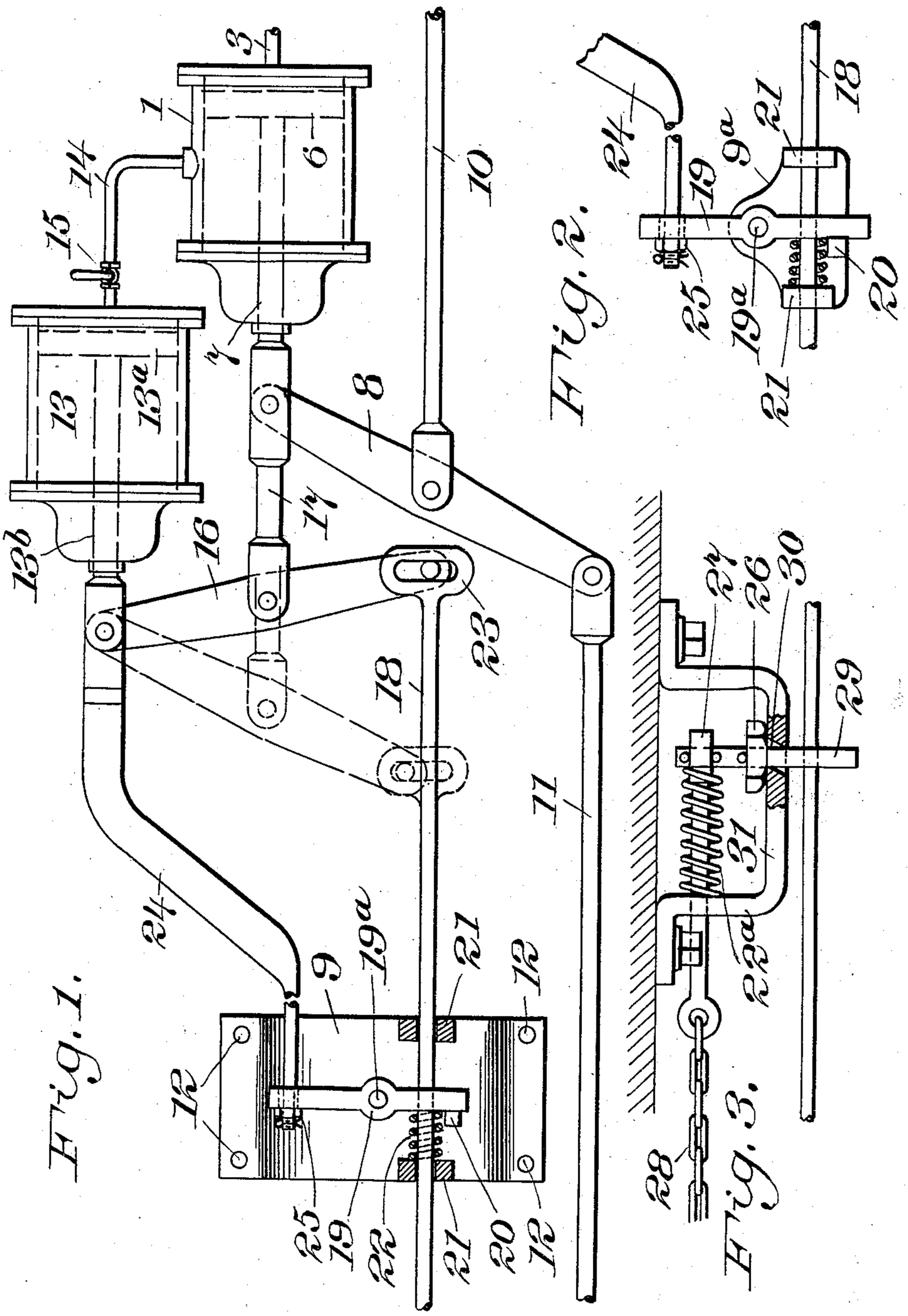

Fig. 1.

Fig. 2.

Fig. 3.

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FLUID-PRESSURE BRAKE.

No. 842,424. Specification of Letters Patent. Patented Jan. 29, 1907.

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To all whom it may concern:

Be it known that I, WILLIAM HENRY SAUVAGE, a citizen of the United States of America, and a resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Fluid-Pressure Brakes, of which the following is a specification.

My invention relates generally to fluid-pressure brake systems, and more specifically comprises an apparatus whereby a second or auxiliary cylinder may operate its piston to reinforce or increase the brake-pressure after the main cylinder has operated its piston to take up the slack and set the brake-shoes against the wheels with an initial pressure of less degree. Heretofore it has been proposed to accomplish this result by means of an arrangement comprising two cylinders and their respective pistons and piston-rods and a clutch, one member of which is carried by the brake-rigging and the other operated by the piston of the auxiliary or second cylinder; but this arrangement I find objectionable for the reason, among others, that the clutch members thus carried by the moving parts are liable to get out of adjustment and that the necessity of attaching such clutches to the piston-rod interferes with the use of the standard brake equipment of cylinder, piston, and piston-rods, which are now in use on so many hundreds of thousands of cars.

My invention avoids these difficulties, and an apparatus embodying the best form thereof at present known to me is illustrated in the accompanying sheet of drawings, in which—

Figure 1 is a plan view of the cylinders and their connections with a portion of the brake-rigging sufficient to illustrate my invention, parts being broken away. Figs. 2 and 3 show modifications.

Throughout the drawings like reference-figures indicate like parts.

1 is the ordinary brake-cylinder, and 3 the pipe connecting the same to the auxiliary reservoir. (Not shown.) The cylinder 1 of course has a piston 6, which by means of its piston-rod 7, lever 8, tie-rod 10, and brake-rod 11 transmits the force of the compressed air admitted to the cylinder 1 to the brake-shoe systems. (Not shown.)

13 is the second or auxiliary cylinder connected to the main cylinder by the pipe 14 and provided with a cut-out cock 15. This pipe connects to the interior of cylinder 1 by a port in the side of said cylinder, which is located at any perdetermined distance—say five and one-half inches from the cylinder-head—so that said port is uncovered and communication to the cylinder 13 opened up only when piston 6 in cylinder 1 has traveled such predetermined distance.

In the auxiliary cylinder 13 is the usual piston 13^a, piston-rod 13^b, pivoted to the ordinary form of brake-lever 16, which is connected by link 17 to the piston-rod 7 of the first cylinder or to the brake-lever 8. The other end of said brake-lever 16 is pivoted to the rod 18, which passes through the friction-clutch 19. This friction-clutch consists of the well-known form comprising a swinging dog 19, pivoted at 19^a and perforated to permit the passage of the rod 18 freely when the dog 19 is in such position that the axis of its perforation is parallel to the axis of the rod 18, but which pinches said rod 18 and prevents it sliding through the perforation as soon as the dog 19 is swung to one side or the other. The pivot 19^a is set in the dished plate 9, which is fastened to the under side of the car-body in any convenient manner, as by bolts passing through bolt-holes 12 12. This affords a fixed base for the clutch. 20 is a stop, 21 21 are guides for the rod 18, and 22 is a spring normally tending to force the dog 19 around so that it will prevent the rod 18 from moving toward the cylinders. 23 is a slotted head for the rod 18, with which a pin on the lever 16 engages so as to allow the lever to arc without bending the rod 18. A rod 24, connected to the second piston-rod, passes through a perforation in the other end of the clutch-dog 19 and has an adjustable stop 25 on its end.

In the modification shown in Fig. 2 the plate 9^a is loosely mounted on the pivot-pin 19^a, so that it may swing with the rod 18 without modifying the relative positions of said rod and the clutch-dog. This dispenses with the necessity of the slotted head 23.

In the modification shown in Fig. 3 the dog 29 hangs vertically through an opening 30 in the frame 31, being loosely held by the

nut or washer 26. Its upper end is engaged by the rod 27, to the other end of which is connected the chain 28. The spring 22ª performs the same function as spring 22 in the other forms of my invention.

Such being the construction the mode of operation of my invention is as follows: The parts being normally in the position shown in full lines in Fig. 1 on the admission of compressed air to the cylinder 1 its piston 6 is forced outward and the lever 16 is thrown into the position shown in broken lines, the rod 18 running freely through the perforation in the clutch-dog 19. As soon as the connection to cylinder 13 is opened up compressed air passes over to said second cylinder 13, piston 13ª begins to move out and tends to swing the lever 16 in the opposite direction. This tends to withdraw rod 18 toward the cylinders through clutch-dog 19, which immediately grips the same and affords a rigid fulcrum for the lever 16. The power applied through the piston-rod 13ᵇ of the auxiliary cylinder causes said lever to turn on this fulcrum and pull out the piston-rod 7 of the main cylinder still farther, thus applying a triple pressure to the brake-rods and brake-shoes. When the engineer releases his brakes, the second piston 13 first moves in until it has nearly reached the cylinder-head. At that moment the stop 25 on the rod 24, which has moved idly through the perforation in the tail end of the clutch-dog heretofore, brings up against the tail of said clutch-dog and trips the clutch, releasing the rod 18, so that the piston in the first or main cylinder may also run home and release the brakes. The operation is identically the same in the construction shown in Fig. 2, except that the whole clutch mechanism swings upon the pivot 19ª and no loose connection between the lever 16 and the rod 18 is required. The same operation takes place in the construction shown in Fig. 3, except that during the outward travel of the piston in the second cylinder the chain 28 is slackened and on the return home of the second piston said chain is tightened and compresses the spring 22ª, trips the clutch, and releases the rod 18.

In setting up the apparatus of course the stop 25 or its equivalent would be adjusted at the point which would just trip the clutch as the second piston went home, and thereafter the automatic operation of the apparatus would take care of itself.

The advantages of my invention comprise the added braking power and economy in the use of compressed air resulting, the convenience of attachment to present systems, which results from the fact that no modification of the standard form of brake-cylinder and piston-rod and brake-levers is required, and the ease of attachment, certainty of action, and non-liability to get out of order of the clutch mechanism, which results from making the same self-contained and attached to the car-body instead of to moving parts of the brake system.

It is evident, of course, that various changes could be made in the details of construction shown without departing from the spirit and scope of my invention. Other arrangements of brake-levers and connecting-links might be substituted for these shown. Different forms of friction clutches or latches might be employed, and the releasing mechanism might be operated by other agencies. These variations in form, however, I should still consider within the boundaries of my invention.

Having, therefore, described my invention, I claim—

1. In a fluid-pressure brake system, the combination with the main brake-cylinder, its piston and piston-rod, brake-rigging and triple valve, of a second auxiliary cylinder, its piston and piston-rod, means for admitting fluid under pressure to the second cylinder after the movement of the piston in the first cylinder has begun, a lever system connecting the piston of the second cylinder with the brake-rigging, an ajustable fulcrum for said lever system comprising a locking device operating to fix the fulcrum during the outward movement of the second piston, and means operated by the return movement of the second piston to trip said locking device.

2. In a fluid-pressure brake system, the combination with the main brake-cylinder, its piston and piston-rod, brake-rigging and triple valve, of a second auxiliary cylinder, its piston and piston-rod, means for admitting fluid under pressure to the second cylinder after the movement of the piston in the first cylinder has begun, a lever system connecting the piston of the second cylinder with the brake-rigging, an adjustable fulcrum for said lever system comprising a friction-clutch operating to fix the fulcrum during the outward movement of the second piston, and means operated by the return movement of the second piston to trip said friction-clutch.

3. In a fluid-pressure brake system, the combination with the main brake-cylinder, its piston and piston-rod, brake-rigging and triple valve, of a second auxiliary cylinder, its piston and piston-rod, means for admitting fluid under pressure to the second cylinder after the movement of the piston in the first cylinder has begun, a lever system connecting the piston of the second cylinder with the brake-rigging, an adjustable fulcrum for said lever system comprising a friction-clutch operating to fix the fulcrum during the outward movement of the second piston, and means operated by the return movement of the second piston to trip said fric-

tion-clutch, said last-mentioned means comprising a connection from the second piston to the tail of the friction-clutch dog.

4. In a fluid-pressure brake system, the combination with the main brake-cylinder, its piston and piston-rod, brake-rigging and triple valve, of a second auxiliary cylinder, its piston and piston-rod, means for admitting fluid under pressure to the second cylinder after the movement of the piston in the first cylinder has begun, a lever pivoted at one end to the second piston and at an intermediate point of its length to the first piston, a rod pivoted to the other end of said lever, a clutch mounted on a fixed base, and coöperating with said rod to normally prevent motion of the same toward the cylinders, and means for tripping said clutch.

5. In a fluid-pressure brake system, the combination with the main brake-cylinder, its piston and piston-rod, brake-rigging and triple valve, of a second auxiliary cylinder, its piston and piston-rod, means for admitting fluid under pressure to the second cylinder after the movement of the piston in the first cylinder has begun, a lever pivoted at one end to the second piston, and at an intermediate point of its length to the first piston, a rod pivoted to the other end of said lever, a clutch mounted on a fixed base, and coöperating with said rod to normally prevent motion of the same toward the cylinders, and means for tripping said clutch, said last-mentioned means comprising a connection from said clutch to the piston-rod of the second cylinder.

6. In a fluid-pressure brake system, the combination with the main brake-cylinder, its piston and piston-rod, brake-rigging and triple valve, of a second auxiliary cylinder, its piston and piston-rod, means for admitting fluid under pressure to the second cylinder after the movement of the piston in the first cylinder has begun, a lever pivoted at one end to the second piston and at an intermediate point of its length to the first piston, a rod pivoted to the other end of said lever, a friction-clutch mounted on a fixed base, and coöperating with said rod to normally prevent motion of the same toward the cylinders, and means for tripping said friction-clutch.

7. In a fluid-pressure brake system, the combination with the main brake-cylinder, its piston and piston-rod, brake-rigging and triple valve, of a second auxiliary cylinder, its piston and piston-rod, means for admitting fluid under pressure to the second cylinder after the movement of the piston in the first cylinder has begun, a lever pivoted at one end to the second piston and at an intermediate point of its length to the first piston, a rod pivoted to the other end of said lever, a friction-clutch mounted on a fixed base, and coöperating with said rod to normally prevent motion of the same toward the cylinders, and means for tripping said friction-clutch, said clutch comprising a pivoted dog having a perforation at one side of the pivot through which the above-mentioned rod passes.

8. In a fluid-pressure brake system, the combination with the main brake-cylinder, its piston and piston-rod, brake-rigging and triple valve, of a second auxiliary cylinder, its piston and piston-rod, means for admitting fluid under pressure to the second cylinder after the movement of the piston in the first cylinder has begun, a lever pivoted at one end to the second piston and at an intermediate point of its length to the first piston, a rod pivoted to the other end of said lever, a friction-clutch mounted on a fixed base, and coöperating with said rod to normally prevent motion of the same toward the cylinders, and means for tripping said friction-clutch, said clutch comprising a pivoted dog having a perforation at one side of the pivot through which the above-mentioned rod passes and said tripping means comprising a loose connection from the other end of said dog to the second piston.

Signed at New York, N. Y., this 23d day of May, 1906.

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Witnesses:

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