

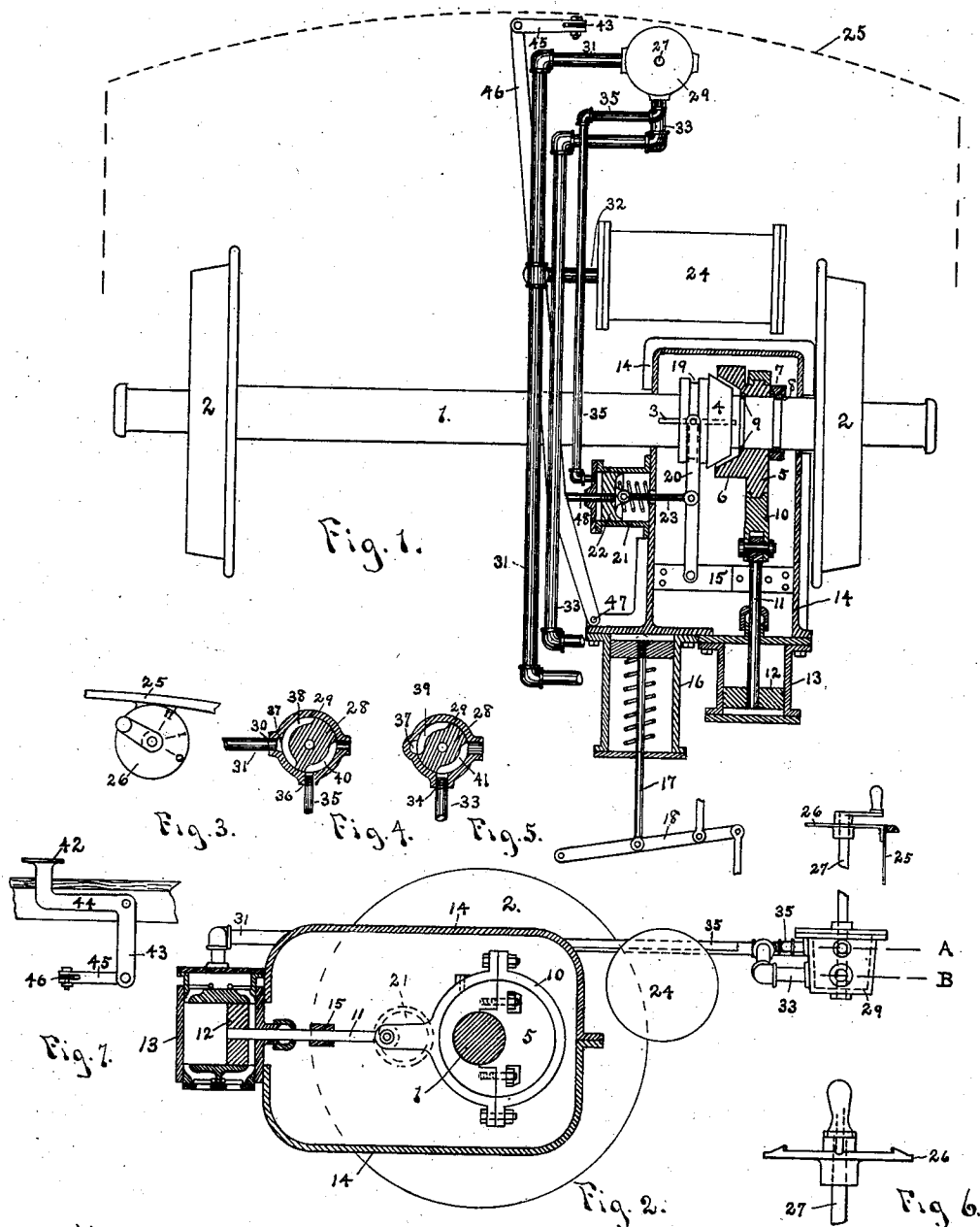
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W. J. VAUGHN.
AIR BRAKE.

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NO MODEL.



Witnesses.

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UNITED STATES PATENT OFFICE.

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AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 755,335, dated March 22, 1904.

Application filed April 27, 1903. Serial No. 154,424. (No model.)

To all whom it may concern:

Be it known that I, WILBUR J. VAUGHN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Air-Brake, of which the following is a specification.

My invention relates to improvements in air-brakes for street-cars; and the objects of my improvements are to provide means by which the air-receiver may be kept charged at all times; to provide means for insuring the action of the air-pump while the brakes are being used, and thus employ an additional force for retarding the revolution of the axle, and thus conserve the energy of the momentum of the car; to provide means for connecting the air-pump to the axle at will, and to provide additional connecting means to be employed for such purpose in case the first is inoperative.

Further objects and advantages of this invention will appear in the following description and are attained by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a general horizontal sectional view of the mechanism, taken on a plane passing through the car-axle, the pipe connections shown being above the said plane. Fig. 2 is a vertical section through the center line of the air-pump, the eccentric and yoke being shown entire. Fig. 3 is a plan of the controller-dial. Figs. 4 and 5 are sections through the controller on the lines A and B of Fig. 2. Fig. 6 is a view of the controller handle and dial. Fig. 7 shows part of the auxiliary mechanism for connecting the air-pump and car-axle.

Similar reference characters refer to like parts throughout the drawings.

The car-axle 1 has the usual wheels 2 and a feather 3. The male member 4 of a clutch is slidable on the axle and clutch and revoluble therewith. Loosely mounted on the axle is the eccentric 5, to one face of which is attached the female member 6 of the clutch. The split collar 7 is bolted together over the two half-rings 8, which rests in one groove of the axle, and thus holds the eccentric and

the part 6 of the clutch against the ring 9, which is also in halves and rests in another groove, as shown, projecting upward into a groove in the eccentric. The eccentric is made in two parts, as shown in Fig. 2, and is surrounded by the two-part yoke 10. This yoke connects with one end of the piston-rod 11 of the air-pump, to the other end of which is attached the piston 12, surrounded by the cylinder 13. This cylinder is supported by the casing 14, which is split horizontally, as shown in Fig. 2, the bar 15 extending across inside the casing forming a support for the piston-rod and also serving to stiffen the casing. To this casing may be attached the brake-cylinder 16, from which projects the rod 17, connected to the lever 18 in the usual manner. The casing may be suspended from the truck of the car or be supported at one end by the axle and at the other end by the same support as the motors.

The clutch member 4 has a circumferential groove 19, in which the two pins of the usual clutch-fork 20 slide. This fork is pivoted at its other end to the cross-bar 15. Attached to the side of the casing, as shown in Fig. 1, is an air-cylinder 21, having a piston 22, pivoted to which is the rod 23, which is again pivoted to the clutch-fork 20. The usual air-receiver 24 is shown in front of the axle; but it may be placed in any convenient location.

The location of the dashboard of the car is indicated by dotted lines in Fig. 1 and is partially shown in Figs. 3 and 6. To the upper edge of this dashboard is attached the controller-dial 26, in which is journaled the controller-shaft 27, to the lower end of which below the floor of the car is attached the valve 28, revoluble in the valve-casing 29. The valve-casing is provided with the following connections: Into the opening 30 is screwed the pipe 31, which passes rearward and is the discharge-pipe of the air-pump. The air-receiver is connected by the branch pipe 32 to the pipe 31. A second pipe 33 connects the brake-cylinder 16 to the opening 34. The pipe 35 extends from the small air-cylinder 22 to the opening 36 just above opening 34. The valve 28 has four passages, as shown in Figs.

4 and 5. The casing has a vertical passage 37, which permits the passage of the air from the pipe 31 to either of the passages 38 and 39. The passages 40 and 41 are exhaust-passages for the two sets of pipes 35 and 33.

The operation of the mechanism is as follows: When the car is first taken from the barn or at any other time that there is no pressure in the receiver, the motorman steps on plate 42, Fig. 7, extending up through the car-floor, swinging the lower end 43 of the bell-crank lever 44 to the right, which lever carries with it the link 45 and the long lever 46, the rear end of which is pivoted to the casing at 47. At an intermediate point this lever presses against the end of the pin 48, screwed into the piston 22. This pin 48 must make a tight fit in the cylinder-head or a small stuffing-box can be used, if desired. The pressure on this pin forces over the clutch-fork 20, clutch member 4, thus locking eccentric 5 to the axle and causing the pump to operate and the receiver 24 to become charged. As soon as pressure is secured the motorman releases lever 44 and swings the controller-handle from "0" to "1," Fig. 3, which turns the valve sufficiently to connect the opening 36 with the passage 37. The air then passes from the receiver through pipe 31, passage 38, pipe 35 to cylinder 21, where it presses on piston 22, and so obviates the necessity of further use of the levers 44 and 46. When it is desired to apply the brake, the handle is turned to the full stop "II," when the opening 34 will be connected to the passage 37. In this case the air passes from the receiver and air-pump, as before, to the passage 37, then through passage 39, pipe 33 to the brake-cylinder. As will be seen, the passage 38 is also in connection with the pipe 35, so that while the brake is applied the air-pump will operate, putting that additional load on the axle, and so retarding the car to that extent. In this way by means of this mechanism, instead of using valuable power to keep the receiver charged, the momentum of the car furnishes the necessary power at a time when it is desirable to overcome this momentum. The lever 46 is bent upward to pass over the axle of the car.

Having now explained my construction, what I claim as my invention, and desire to secure by Letters Patent, is—

1. In an air-brake for cars, the combination of the car-axle, an air-pump, normally inoperative means for connecting said air-pump to said car-axle, and a plurality of means for making said connection operative.

2. In an air-brake for cars, the combination of the axle, an air-pump, a clutch for operatively connecting said air-pump and axle, and a plurality of means for operating said clutch.

3. In a car, the combination of the axle, an air-pump, connecting means between the axle and pump, a friction-clutch for making said connecting means operative, a receiver, a pneu-

matic cylinder and piston for operating said clutch, and a foot-lever for operating said clutch.

4. In an air-brake for cars, the combination of the car-axle, an air-pump, a friction-clutch for operatively connecting said air-pump and axle, a casing, a lever in said casing for operating said clutch, and a second lever extending to the dash-board of the car for actuating the first-named lever.

5. In a car, the combination of an axle, an air-pump having one member of a friction-clutch, a second member of said clutch revoluble with the axle, pneumatic means for operating the clutch, an auxiliary lever for operating said clutch and a plate so situated that it may be actuated by the foot of the operator for actuating the lever.

6. In a car, the combination of the axle, an air-pump, an eccentric for driving said pump, a friction-clutch connecting said eccentric to the axle, a lever to operate the clutch, a pneumatic piston and cylinder to operate said lever and a foot-lever to operate said clutch-operating lever.

7. In an air-brake for cars, the combination of the car-axle, an air-pump, normally inoperative means for connecting said axle and pump, pneumatically-operated means for making said connection operative, and auxiliary means for making said connection operative.

8. In an air-brake for cars, the combination of the car-axle, an air-pump, a clutch for operatively connecting said axle and air-pump, pneumatically-operated means for operating said clutch, and auxiliary means for operating said clutch.

9. In an air-brake for cars, the combination of the car-axle, an air-pump, normally inoperative means for connecting said axle and pump, a lever for making said connection operative and pneumatically-operated means for making said connection operative.

10. In an air-brake for cars, the combination of the car-axle, an air-pump, normally inoperative means for connecting the axle and air-pump, a lever for making said connection operative and an air-cylinder and piston for making said connection operative.

11. In an air-brake for cars, the combination of the car-axle, an air-pump, a clutch for operatively connecting said axle and pump, a lever for operating said clutch and pneumatically-operated means for operating said clutch.

12. In an air-brake for cars, the combination of the car-axle, an air-pump, a clutch for operatively connecting said air-pump and axle, a lever for operating said clutch and an air-cylinder and piston for operating said clutch.

13. In an air-brake for cars, the combination of the car-axle, an air-pump, normally inoperative connections between the axle and pump, pneumatically-operated means for making said connection operative, a receiver, a pneu-

a manually-operated rotary controller-valve at the front of the car for governing all the operation of the connection, a shaft to turn said valve, and a handle supported by the dashboard attached to said shaft to operate said valve.

14. In an air-brake for cars, the combination of the car-axle, an air-pump, normally inoperative means connecting the axle and pump, a pneumatic cylinder and piston for making said connection operative, a receiver, and a manually-operated rotary controller-valve for governing the passage of air from the receiver to the pneumatic cylinder, so that said pump will be operated whenever air is discharged from said receiver, and an auxiliary lever for operating the connecting means.

15. In an air-brake for cars, the combination of the car-axle, an air-pump, a clutch for operatively connecting said axle and pump, pneumatically-operated means for operating said clutch, a receiver, and a manually-operated rotary controller-valve for permitting and preventing the passage of air from the receiver to the clutch-operating means, an upright shaft at the dashboard of the car for turning said valve, and a handle for said shaft.

16. In an air-brake for cars, the combination of the car-axle, an air-pump, a clutch for operatively connecting the axle and pump, a pneumatic cylinder and piston for making said connection operative, a receiver, and a manually-operated rotary controller-valve for permitting and preventing the passage of air from the receiver to the clutch-operating cylinder, an upright shaft at the dashboard of the car for turning said valve, and a handle for said shaft.

17. In an air-brake for cars, the combination of the axle, an air-pump, normally inoperative means connecting the axle and pump, pneumatically-operated means for making said connection operative, a controller for governing the operation of the connection and other auxiliary means for making said connection operative.

18. In an air-brake for cars, the combination of the car-axle, an air-pump, normally inoperative connections between the axle and air-pump, pneumatically-operated means for making said connection operative, a controller for governing the operation of the connection and an auxiliary lever for making said connection operative.

19. In an air-brake for cars, the combination of the axle, an air-pump, normally inoperative connections between the air-pump and axle, a pneumatic cylinder and piston for making said connection operative, a controller for said cylinder and piston and other auxiliary means for making said connection operative.

20. In an air-brake for cars, the combination of the car-axle, an air-pump, normally inoperative connections between the axle and

pump, a pneumatic cylinder and piston for making said connection operative, a controller for said piston and cylinder and an auxiliary lever for making said connection operative.

21. In an air-brake for cars, the combination of the car-axle, an air-pump, a clutch for operatively connecting the axle and pump, pneumatically-operated means for operating said clutch, a controller for governing the operation of said clutch and other auxiliary means for operating said clutch.

22. In an air-brake for cars, the combination of the car-axle, an air-pump, a clutch for operatively connecting said axle and pump, pneumatically-operated means for operating said clutch, a controller for governing the operation of the clutch, and an auxiliary lever for operating said clutch.

23. In an air-brake, the combination of the car-axle, an air-pump, a clutch for operatively connecting the axle and pump, a pneumatic cylinder and piston for making said connection operative, a controller for governing said operation, and other auxiliary means for operating said clutch.

24. In an air-brake for cars, the combination of the car-axle, an air-pump, a clutch for operatively connecting said pump and axle, a pneumatic cylinder and piston for operating said clutch, a controller for governing said operation, and an auxiliary lever for making said connection operative.

25. In an air-brake, the combination of the car-axle, an air-pump, normally inoperative means for connecting the axle and pump, means for rendering said connection operative, a brake-cylinder, and a controller for so governing the connecting means that it may be operative during the time that the brake-cylinder is inoperative.

26. In an air-brake for cars, the combination of the car-axle, an air-pump, normally inoperative means for connecting the axle and pump, means for rendering said connection operative, a brake-cylinder, and a controller for governing the connecting means that it must be operative during the time that the brake-cylinder is operative.

27. In an air-brake for cars, the combination of the car-axle, an air-pump, normally inoperative means for connecting the pump and axle, means for rendering said connection operative, a brake-cylinder, a controller for so governing the connecting means that it may be operative during the time the brake-cylinder is inoperative but must be operative during the time that the brake-cylinder is operative.

28. In an air-brake for cars, the combination of the car-axle, an air-pump, normally inoperative means for connecting the pump and axle, means for rendering said connection operative, a brake-cylinder, a controller for so governing the connecting means that it may be operative during the time the brake-cylinder

is inoperative, but must be operative during the time that the brake-cylinder is operative, and other auxiliary means for operating said connection.

5 29. In an air-brake for cars, the combination of the car-axle, an air-pump, normally inoperative means for connecting the pump and axle, means for rendering said connection operative, a brake-cylinder, a controller for so
10 governing the said connection that it may be operative during the time that the brake-cylinder is inoperative, but must be operative during the time that the brake-cylinder is operative, and an auxiliary lever for operating
15 said connection.

30. In an air-brake for cars, the combination of the axle, an air-pump, a clutch for connecting the axle and pump, pneumatically-operated means for operating said clutch, a brake-
20 cylinder, and a controller for permitting the passage of the fluid to the clutch-operating means before and without its escape to the brake-cylinder.

31. In an air-brake for cars, the combination
25 of the axle, an air-pump, a clutch for connecting the axle and pump, an air-cylinder and piston for operating the clutch, a brake-cylinder, and a controller for permitting the passage of the fluid to the brake-cylinder only
30 after permitting it to escape to the clutch-operating cylinder, but permitting its escape to the clutch-operating cylinder without its escape to the brake-cylinder.

32. In an air-brake for cars, the combination with the axle, of an air-pump, a clutch for connecting the pump to the axle, a brake-cylinder, an air-cylinder and piston for operating said clutch, a controller so constructed that a partial operation of the handle will permit the escape of the fluid to the clutch-operating cylinder only, and a further operation of the handle will permit the escape of the fluid to the brake-cylinder.

33. In an air-brake, the combination of the car-axle, an air-pump, a clutch for connecting the pump to the axle, a receiver, a brake-cylinder, an air-cylinder for operating the clutch, a controller-valve having passages, pipes connecting said valve with the receiver the brake-cylinder and the clutch-operating cylinder
50 a handle for said controller having three operative positions, the first of said positions causing the connection of the brake and clutch cylinders with the exhaust, the second position connecting the clutch-cylinders with the receiver, and the third position connecting the
55 brake-cylinder and keeping the clutch-cylinder connected with the receiver.

In testimony of which I have signed my name to this specification in the presence of two subscribing witnesses.

WILBUR J. VAUGHN.

Witnesses:

EDWARD N. PAGELSEN,
LYLE G. YOUNGLOVE.