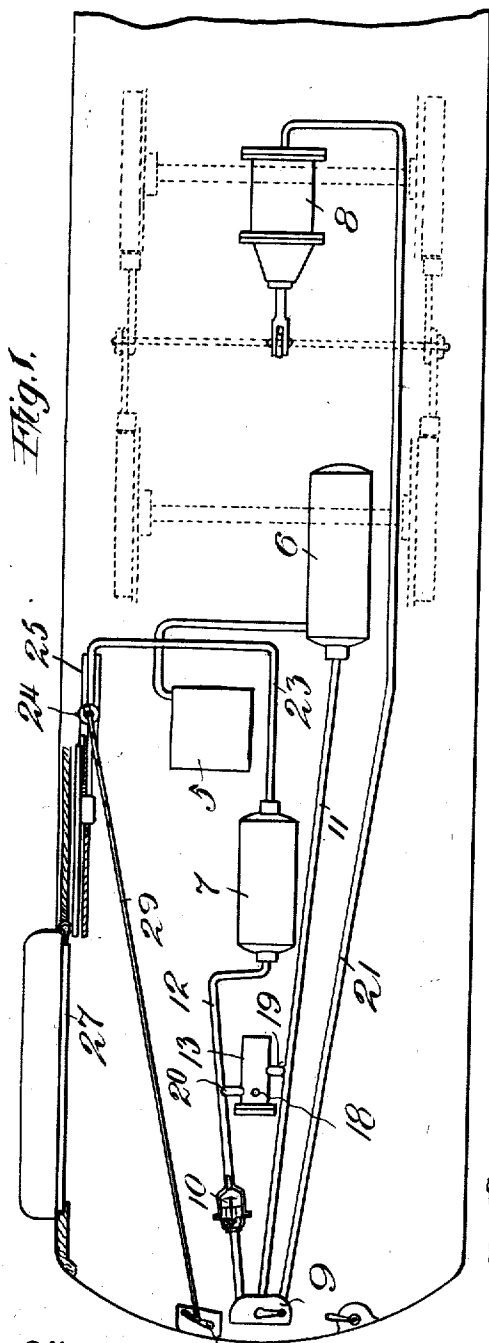


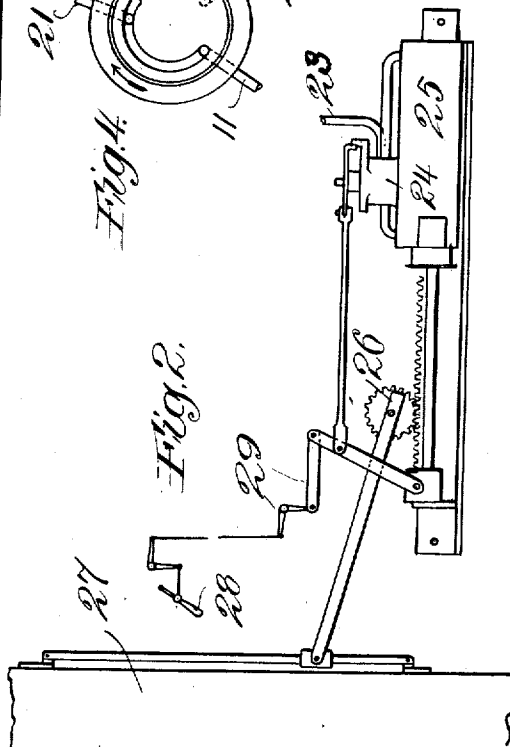
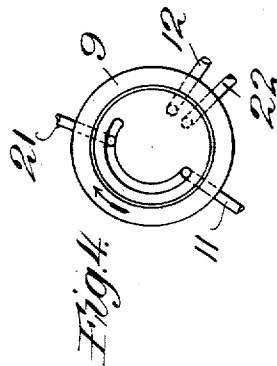
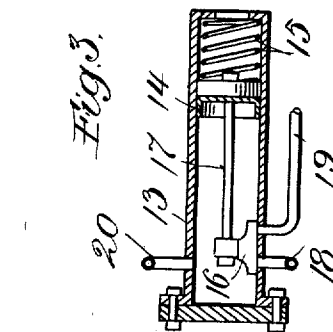
H. ROWNTREE & G. M. SPENCER.
 COMBINED STREET CAR PNEUMATIC DOOR DEVICE AND BRAKE RELEASE MECHANISM.
 APPLICATION FILED JAN. 18, 1909.

954,592.

Patented Apr. 12, 1910.



Witnesses:
[Signature]
[Signature]



Inventors:
 Harold Rowntree
 George M. Spencer
 By *[Signature]* Samuel E. Clark

UNITED STATES PATENT OFFICE.

HAROLD ROWNTREE, OF CHICAGO, ILLINOIS, AND GEORGE M. SPENCER, OF ST. LOUIS, MISSOURI, ASSIGNORS TO BURDETT-ROWNTREE MANUFACTURING COMPANY, A CORPORATION OF ILLINOIS.

COMBINED STREET-CAR PNEUMATIC DOOR DEVICE AND BRAKE-RELEASE MECHANISM.

954,592.

Specification of Letters Patent. Patented Apr. 12, 1910.

Application filed January 18, 1909. Serial No. 472,951.

To all whom it may concern:

Be it known that we, HAROLD ROWNTREE, of Chicago, county of Cook, State of Illinois, and GEORGE M. SPENCER, of St. Louis, State of Missouri, both citizens of the United States, have made a certain new and useful Invention in Combined Street-Car Pneumatic Door Device and Brake-Release Mechanism, of which the following is a specification.

This invention relates to combined street car pneumatic door operating and brake release devices.

The object of the invention is to provide means for collecting and saving the waste or exhaust pressure, or a portion thereof, from pneumatic brake mechanism, such as is employed on street or other railway cars, and utilizing such waste or exhaust pressure to operate, or to control the operation of auxiliary devices such as doors, steps or the like.

The invention consists substantially in the construction, combination, location and relative arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawing, and finally pointed out in the appended claims.

In the drawing Figure 1 is a diagrammatic view in plan of a portion of a car showing the application of our invention for utilizing the waste or exhaust pressure from the brake mechanism for the operation of auxiliary devices such as doors, steps or the like. Fig. 2 is a diagrammatic view showing a form of auxiliary device operating mechanism adapted for use in connection with our invention. Fig. 3 is a broken detail sectional view of an automatic regulating device employed in connection with our invention. Fig. 4 is a view illustrating a form of controlling valve for use in connection with our invention.

The same part is designated by the same reference sign wherever it occurs throughout the several views.

In Patent No. 877,959, granted Feb. 4, 1908, to George M. Spencer, is shown described and claimed a construction and arrangement of apparatus for collecting and saving a portion of the waste or exhaust pressure from pneumatically operated brake mechanism on cars, for reuse in the pump

employed to secure the desired compression of the pressure medium, thereby enabling the pump to be maintained under a desirable load in starting up. The present invention relates to the same general character of apparatus but, more particularly, to means for utilizing the conserved waste or exhaust pressure medium for the purpose of operating auxiliary devices employed on the car, such, for instance, as doors, steps or the like.

In the drawing reference sign 5, designates the air compressor or pump; 6, the higher pressure tank into which the compressor or pump delivers; 7, an auxiliary or low pressure tank; 8 the brake cylinder; and 9, a controller for controlling the communications between the tanks 6 and 7, and the brake cylinder 8.

The parts so far described may be of the usual construction and arrangement, or, as shown and described in the Spencer patent No. 877,959, above referred to, and the operation thereof will be readily understood. The pump 5 delivers the operating pressure medium into the high pressure tank 6. By suitably manipulating the controller 9, the pressure medium is supplied from the high pressure tank 6; to the brake cylinder 8, to effect the desired application of the brakes. By another or a further manipulation of the controller 9, the pressure medium is exhausted from the brake cylinder in order to release the brake mechanism. Instead of exhausting from the brake cylinder directly into the atmosphere, whereby the pressure of the exhaust is lost and wasted, we arrange for such exhaust to be effected into the auxiliary or low pressure tank 7, until the brake cylinder and auxiliary tank pressures are equalized, and, thereafter, if necessary or required, the further exhaust from the brake cylinder to effect a complete release, may be made directly into the atmosphere or otherwise, as may be desired. A check valve 10, may serve to prevent the pressure in the auxiliary or low pressure tank from escaping back towards the controller 9, or the brake cylinder.

The arrangement of the controller 9, is indicated in Fig. 4, and is such that when the handle thereof is placed in the position

shown the high pressure tank is placed in communication through pipe 21, with the brake cylinder to effect the application of the brakes, as above indicated. If the controller handle is moved slightly from this position in the direction indicated by the arrow, the brake cylinder will be shut off from the high pressure tank, leaving the brakes applied. This is known as the "lap" position of the controller. A further movement of the controller handle will serve to open the brake cylinder to the low pressure tank through pipe 12, and the controller will then be in what is known as the "partial exhaust" position, that is, the brakes will be partially relieved. Further movement of the controller will open the brake cylinder to the atmosphere through the pipe 22 or otherwise.

In the operation of brake mechanism it is always desirable to release the pressure medium more or less gradually as the car slows down, for, if the brakes are left fully applied until the car is finally stopped there would be an objectionable jerky stop of the car, and if the brakes are relieved too soon there would be a failure to stop at the right point. In order to obtain the preliminary or partial exhaust it is customary to employ a comparatively small partial exhaust opening, or if only a single exhaust opening is used it is opened only slightly in partial exhaust position, so that the air from the brake cylinder will not escape to the atmosphere too rapidly, but when the controller is moved to full exhaust position a free exhaust is obtained. In accordance with our invention we separate the preliminary or partial exhaust from the full or free exhaust and pipe the connection from the partial exhaust to the low pressure tank. Therefore, each time the handle of the controller 9, is placed in partial exhaust position the pressure in the air brake cylinder equalizes or tends to equalize into the low pressure tank 7, with the result that any desired pressure may be maintained in the low pressure tank, the check valve 10, preventing the pressure from escaping from the low pressure tank when the controller is moved to full exhaust position.

It is important that the pressure in the low pressure tank be prevented from falling below a predetermined point through use of the pressure therefrom for the operation of auxiliary devices, such as doors, steps or the like. It is equally important that the pressure in the low pressure tank be prevented from exceeding a predetermined maximum. For, if through failure to use the pressure in the low pressure tank for the operation of auxiliary devices, or for other purposes, and the brake mechanism is meanwhile applied and released several times, the pressure in the low pressure tank

would build up and increase until there is a failure to secure the desired preliminary or partial release of the brake mechanism when the controller handle is moved to partial release position, since the low pressure tank, and the brake cylinder pressures will have been brought to equality by the accumulation of the pressure in said tank. On the other hand, if the pressure in the low pressure tank is permitted to fall below a desirable point there may not be sufficient pressure therein to effect the operation of the auxiliary devices. In order to avoid these and other difficulties we propose, in accordance with the principles of our invention, to employ a pressure regulator having such relation and arrangement as to maintain substantially a uniform pressure in the low pressure tank. This pressure regulator is interposed between the pipes 11, 12, respectively delivering from the high pressure tank 6 to the controller 9, and from the controller to the low pressure tank 7, and consists of a cylinder 13, having a piston 14, therein, exposed on one side to the pressure medium and on the other side to the atmosphere and to the tension of a compression spring 15. A valve 16, connected to the rod 17 of the piston, controls two ports, one delivering by pipe 18, or otherwise to the atmosphere, and the other communicating by pipe 19, or otherwise, with the high pressure tank 6. A pipe 20, communicates between the cylinder 13, on the pressure side of piston 14, and the low pressure tank. The tension of spring 15 is regulated to the required point to enable substantially uniform pressure to be maintained in the low pressure tank. In the position shown in Fig. 3, both ports controlled by valve 16, are closed while there is a free communication between the regulator cylinder and the low pressure tank. If now, the pressure in the low pressure tank should fall below the point as predetermined by the tension of spring 15, said spring will actuate the piston 14 and through it the valve 16, in a direction to open the connection 19, to the regulator cylinder thereby admitting pressure from the high pressure tank to the low pressure tank until the pressure in the latter rises sufficiently to overcome the tension of spring 15, and again cause valve 16, to shut off the connection 19, from the high pressure tank. On the other hand, if the pressure in the low pressure tank builds up to a degree above the predetermined maximum the tension of spring 15, will be overcome and the piston 14, will move in a direction to cause valve 16, to open the exhaust connection 18, thereby causing the pressure in the low pressure tank to again fall. Thus it will be seen that we secure automatically a most efficient regulation and control of the pressure in the low pressure tank.

From the low pressure tank 5, in which waste or exhaust pressure from the brake cylinder is collected and stored, the pressure medium is drawn for use in operating the 5 auxiliary devices. In the particular embodiment of our invention which we have selected for the purposes of illustration, we have shown an arrangement for effecting the operation of the car door, but of course 10 it is to be understood that our invention, as defined in the claims, is not to be confined or limited with respect to the particular form of auxiliary devices to be operated, as it is obvious that other devices besides doors, 15 such for instance, as steps, bells, whistles, sanding mechanism and the like may be operated or controlled with equal facility by the stored up or conserved waste or exhaust pressure from the brake cylinder.

20 In the form shown a pipe 23, delivers from the low pressure tank 7, to a valve casing 24, in which a suitable valve controls the supply and exhaust of the pressure medium to and from the power cylinder 25, for operating suitable mechanism, indicated at 26, 25 having connection with the door 27, for controlling the movements of the latter. The supply and exhaust of the medium to and from the power cylinder 25, may be controlled from any convenient point and 30 through any convenient valve operation connections. We have shown a valve control, handle 28, and intermediate connections 29, for this purpose.

35 In pending applications for patents of Harold Rowntree, Serial No. 393,911, filed Sept. 21, 1907, and of Paris R. Forman Serial No. 393,908, filed Sept. 21, 1907, and in Patent No. 870,051, granted Nov. 5, 1907, 40 to Rowntree, are shown various forms and constructions of auxiliary devices such as door and step operating means which can be employed in connection with our present invention, and therefore specific and detailed 45 description of such devices herein is unnecessary.

From the foregoing description it will be seen that we provide means which are simple and efficient for operating the doors, or other 50 auxiliary devices from the exhaust or waste from the brake mechanism, and hence without requiring any special compressor mechanism for the pressure medium, and without imposing any extra duty on the compressor or pump employed in connection 55 with the brake mechanism. While the amount of compressed air required for operating the doors, steps or the like, of cars is not great, and while when the equipment 60 is new the compressor for the brake mechanism is usually amply able to supply the required pressure for operating the brakes, as well as auxiliary devices, yet, owing to the natural wear and tear incident to continued 65 service use of the apparatus, the capacity

of the compressor in relation to the brake pressure required, is lessened until a point is reached where the pressure supplied therefrom is not more than that required to properly operate the brakes, and even the 70 slight additional duty imposed thereon when pressure medium is drawn directly therefrom for operating the doors or other auxiliary devices is sufficient to overtax the compressor with the result that neither the brakes 75 nor the auxiliary devices are properly or efficiently operated. It will be observed that in our invention we overcome this difficulty by utilizing the waste or exhaust from the brake cylinder. It will also be seen that 80 our invention may be readily applied to cars already in use and equipped with air brake mechanism, thereby enabling such cars to be readily supplied with pneumatic door or step operating mechanism without imposing 85 any extra duty on the air brake compressor.

Having now set forth the object and nature of our invention, and a construction and arrangement embodying the principles thereof, and having described such construction its purposes, function and mode of operation, what we claim as new and useful, 90 and of our own invention, and desire to secure by Letters Patent is:—

1. In a car, the combination with pressure operated brake mechanism, of a door or other auxiliary device, actuating means connected thereto, and means for utilizing the exhaust from the brake mechanism for operating the actuating means of said door 100 or other auxiliary device.

2. In a car, the combination with pressure operated brake mechanism, of auxiliary movable devices, actuating means therefor, means for storing a portion of the exhaust 105 from the brake mechanism, and means for utilizing the stored exhaust pressure to operate said actuating means.

3. In a car, the combination with pressure operated brake mechanism, and means 110 for effecting a partial exhaust of the pressure medium to gradually release the brake mechanism, of means for storing up the partial exhaust from the brake mechanism, auxiliary movable pressure operated devices, and means for utilizing the stored 115 up partial exhaust from the brake mechanism for moving said auxiliary devices.

4. In a car, the combination with an air brake mechanism means for partially exhausting the operating medium therefrom in advance of the full exhaust, and means 120 for storing up the partial exhaust, of a door, and means for utilizing the stored up partial exhaust for operating the door. 125

5. In a car, the combination of a high pressure tank, a compressor delivering thereto, means operated by the pressure from said tank, a low pressure tank into which said means exhausts, and auxiliary movable 130

devices operated by pressure from said low pressure tank.

6. In a car, the combination of a high pressure tank and a low pressure tank, means operated by pressure from the high pressure tank and exhausting into the low pressure tank, a check valve for preventing the return of such exhaust pressure from the low pressure tank, and auxiliary movable means having actuating devices operated by pressure from the low pressure tank.

7. In a car, the combination of a high pressure tank, a low pressure tank, means operated by pressure from the high pressure tank and exhausting into the low pressure tank, auxiliary devices operated by pressure from the low pressure tank, a pressure regulator communicating respectively with said tanks and the atmosphere and including an automatically operated valve for controlling said communications.

8. In a car, a pump, a tank to which the pump delivers, a brake mechanism operated from said tank, a low pressure tank into which the brake mechanism exhausts, a power cylinder supplied with operating medium from said low pressure tank, a door, and mechanism operated by said power mechanism for moving said door.

9. In a car, a high pressure tank, a low pressure tank and a brake cylinder, a controller for controlling the connections between said tanks and cylinder and operating to supply pressure medium from the high pressure tank to the brake cylinder, and to supply the exhaust from said cylinder to the low pressure tank, auxiliary movable devices, pressure actuated means for operating said devices, and means for supplying pressure from said low pressure tank to said pressure actuated means.

10. In a car, the combination with pressure operated brake mechanism, of pressure operated auxiliary devices, means for stor-

ing a portion of the exhaust from the brake mechanism, and means for maintaining said stored exhaust to operate the auxiliary device.

11. In a car, the combination with pressure operated brake mechanism, and means for effecting a partial exhaust of the pressure medium in advance of the full exhaust to gradually release the brake mechanism, of means for storing up the partial exhaust from the brake mechanism, means for preventing said stored up partial exhaust pressure from exceeding a predetermined maximum, auxiliary pressure operated devices, and means for utilizing the stored up partial exhaust pressure for operating said auxiliary devices.

12. In a car, the combination with an air brake mechanism, means for partially exhausting the operating medium therefrom in advance of the full exhaust, means for storing up the partial exhaust pressure, and means for preventing the stored up partial exhaust pressure from falling below a predetermined minimum pressure, of a door, and means for utilizing the stored up partial exhaust pressure for operating the door.

13. In a car, the combination of a high pressure tank, a compressor delivering thereto, means operated by the pressure from said tank, a low pressure tank into which said means exhausts, means for maintaining substantially uniform pressure in the low pressure tank, and auxiliary devices operated by pressure from said low pressure tank.

In testimony whereof we have hereunto set our hands in the presence of the subscribing witnesses, this 11th day of January A. D., 1909.

HAROLD ROWNTREE.
GEORGE M. SPENCER.

Witnesses:

LEMUEL M. SHIELDS,
ADELINE F. BISHOP.