1,062,223

PATENT SPECIFICATION

DRAWINGS ATTACHED

1,062,223

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Int. Cl.:—B 61 h, F 16 d // F 16 k

COMPLETE SPECIFICATION

Air Brake Valve

We, LANCIA & C. FABBRICA AUTOMOBILI TORINO S.P.A., an Italian Company of 27 via Vincenzo Lancia, Turin, Italy, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns valves for air brake systems installed on traction vehicles adapted to haul trailers, and wherein a compressed air reservoir for braking the trailer is mounted on the vehicle and is connected through said valve to a trailer brake service delivery conduit and a trailer brake emergency delivery conduit.

This invention provides an improved valve which permits braking of the trailer in the event of a breakage of said service delivery conduit, effecting a sudden braking instead of a gradual one, as soon as the brake pedal is operated. This invention provides also a brake control circuit for traction vehicles adapted to haul a trailer incorporating the above mentioned valve.

According to this invention there is provided a cut-off valve for a compressed air brake mechanism of a traction vehicle towing a trailer, said valve being interposed between a trailer brake reservoir mounted on the traction vehicle and a trailer brake service delivery conduit and a trailer brake emergency delivery conduit, said valve when in its inoperative position connecting the service delivery conduit to the atmosphere and the emergency conduit to said reservoir, wherein the valve comprises means for closing the service delivery conduit with respect to the atmosphere and connecting it with the emergency delivery conduit upon an application of the brakes and also for cutting off said reservoir from both service and emergency delivery conduits while maintaining the said two conduits interconnected when the trailer brake service delivery conduit fails.

In order that the invention may be more readily understood, and further features of the same more fully appreciated, certain embodiments of valve in accordance with this invention as applied to certain braking circuits will now be described by way of example, and with reference to the accompanying drawings, in which:—

FIGURE 1 is a diagrammatical view of one embodiment of valve controlled by a single braking circuit of a traction vehicle;

FIGURE 2 is a diagrammatical view of another embodiment of a valve control led by two independent braking circuits of a traction vehicle; and

FIGURE 3 is a diagrammatical view of a brake control circuit employing the valve shown of Figure 2.

The same reference numerals are employed throughout the figures to denote corresponding parts.

The brake control circuit shown in Figure 3 essentially comprises two compressors 1, 2 mechanically interconnected, but pneumatically independent of each other. The compressors 1, 2 supply compressed air to reservoirs 8, 7 for the brakes of the traction vehicle through conduits 3, 4 and regulators 6, 5. The regulator 6 additionally permits compressed air to be supplied to a reservoir 10 for the trailer brake, which reservoir 10 is mounted on the traction vehicle.

Traction vehicle braking circuits extend from the reservoir 7, 8 and comprise conduits 11, 12, respectively, leading to a pair of distributors 13, 14 operated by a brake pedal 15.

A conduit extends from the distributor 13 and branches into a conduit 16 connected with cylinders 17 for the rear wheels brakes. The said conduit is also connected to a conduit 29 in turn connected to cut-off valve 100 which will be described in more detail hereafter.

A conduit extending from the distributor 14 branches into a conduit 18, connecting with the front wheels brake cylinders 19, and a conduit 28 extending to the valve 100. A trailer brake service delivery conduit 22*b* and a trailer

brake emergency delivery conduit 22*a* extend from the valve 100 and are connectable through a coupling 23 with a trailer brake circuit of known kind, not shown on the drawing and comprising a compressed air reservoir mounted on the trailer for actuating the trailer brakes when the conduit 22*b* fails, as will be later described. The valve 100 is connected by a conduit 22 to the reservoir 10.

All the components described heretofore, with the exception of the cut-off valve 100 are known in the art and do not require a detailed description.

The valve 100 according to this invention, has a chamber 101 communicating with a conduit 22 connected to the reservoir 10, a chamber 102 communicating with the trailer brake emergency delivery conduit 22*a*, a chamber 103 connected to the trailer brake service delivery conduit 22*b*, a lower chamber 104 connected to one end of a conduit 105, the other end of which is connected to the chamber 102, and a discharge chamber 106 opening to the atmosphere. A hollow plunger 107 is mounted in the body of the valve 100, the plunger being open at the bottom and closed at the top, and having its wall formed with a hole 108, (Figure 2), opening into the discharge chamber 106. A diaphragm 109 is fixedly mounted on the plunger 107 and defines above the chamber 103 a chamber 118 for compressed air from the traction engine braking circuit. In the construction shown in Figure 2 a diaphragm 110 is slidably mounted on the plunger 107 and subdivides the chamber 118 into a chamber 111 communicating with the conduit 28, and a chamber 112 communicating with the conduit 29. A spring 113 acts on the diaphragm 109 and urges the plunger 107 upwardly. A valve member 114 urged towards its closed position by a light spring 115, is normally biassed to its open position by the plunger 107 and alternately connects the chamber 101 with the chamber 102 and disconnects it therefrom. A valve member 116 urged to its closed position by a spring 117 is adapted to be opened by the plunger 107 to connect the chamber 103 with the chamber 104.

The valve 100 shown in Figure 1 is similar to the valve shown in Figure 2, but differs in that it is deprived of the slidable diaphragm 110 in the chamber 118, the latter communicating with the traction vehicle braking circuit.

The brake mechanism shown in Figure 3 which includes a valve of the kind shown in Figure 2 operates as follows.

Under normal conditions or when the brake is inoperative, the automatic regulating valve 100 is in the position as shown in the drawings, namely a position in which the plunger 107 is lifted, and the reservoir 10 connects through conduit 22, chamber 101 and chamber 102 with the trailer brake emergency delivery conduit 22*a*. The trailer brake service delivery conduit 22*b* connects with the atmosphere through the chamber 103, the hollow in the plunger 107, the hole 108 and the discharge chamber 106.

When the brakes are applied by depressing the brake pedal 15, rear and front wheel brake cylinders on the traction vehicle 17—17 and 19—19, respectively, are actuated and compressed air is forced through conduits 28, 29 to the chamber 118 which pushes the diaphragm 109 and consequently the plunger 107 downwardly, the plunger firstly bearing on the valve member 116 to halt discharge from the chamber 103 and then moving the valve member 116 against the action of spring 117, whereby the trailer brake service delivery conduit 22*b* is connected with the trailer brake emergency delivery conduit and reservoir 10 through chamber 103, chamber 104, conduit 105, chamber 102, chamber 101 and conduit 22. The spacing of the base of the plunger 107 from the valve member 116 is smaller than the spacing of the valve member 114 from its seat 119, so that the valve member 116 opens while the valve member 114 is still open. Since the pressure in chamber 118 substantially equals the pressure in the chamber 103, the plunger 107 is maintained by the diaphragm 109 in a balanced condition, both valve members 116, 114 being open.

In the event of damage to the trailer brake service delivery conduit 22*b*, pressure in the chamber 103 connecting with the said conduit falls below the pressure prevailing in the chamber 118, whereby compressed air in the latter moves the plunger 107 further downwardly against the action of the spring 113, thereby closing the valve member 114 and shutting off the reservoir 10. As the valve 116 remains open the conduit 22*a* connects with the conduit 22*b* through chamber 102, conduit 105, chamber 104 and chamber 103, so that a fall in pressure in the conduit 22*b* results in a fall in pressure in the conduit 22*a*.

As mentioned before, the trailer brake circuit comprises a compressed air reservoir mounted on the trailer. This reservoir is connected to the trailer brake cylinders in a known manner by means of a conduit controlled by a normally closed valve which opens when pressure in the conduit 22*a* falls. Consequently, when the trailer brake service delivery conduit 22*b* fails and the valve 100 connects the conduit 22*b* to conduit 22*a*, the trailer brakes are automatically applied.

WHAT WE CLAIM IS:—

1. A cut-off valve for a compressed air brake mechanism of a traction vehicle towing a trailer, said valve being interposed between a trailer brake reservoir mounted on the traction vehicle and a trailer brake service delivery conduit and a trailer brake emergency delivery conduit, said valve when in its inoperative position connecting the service delivery conduit to the atmosphere and the emergency conduit

to said reservoir, wherein the valve comprises means for closing the service delivery conduit with respect to the atmosphere and connecting it with the emergency delivery conduit upon an application of the brakes and also for cutting off the said reservoir from both service and emergency delivery conduits while maintaining the said two conduits interconnected when the trailer brake service delivery conduit fails.

2. A valve according to claim 1, wherein said valve includes a first chamber connecting with the reservoir, a second chamber connecting with the trailer brake emergency delivery conduit and normally connecting with the said first chamber, and a third chamber connecting with the trailer brake service delivery conduit normally opening to the atmosphere, a first valve member closing the port connecting the first and second chamber, a second valve member closing a port connecting the second and third chambers, and pneumatic control means adapted to close the third chamber from the atmosphere and open the second valve member on application of the brakes and to moreover close the first valve member and cut off the reservoir when the trailer brake service delivery conduit fails.

3. A valve according to claim 2, wherein the pneumatic control means comprise a hollow plunger open at the bottom and closed at the top and having its wall formed with a hole open to the atmosphere, the said plunger being resiliently urged by spring means so that its closed end urges the third valve member to its open position, and its open end connecting with the third chamber is lifted from the second valve member, a diaphragm being fixedly mounted on the said plunger and having a face turned towards the third chamber and a face turned towards a chamber connecting with the traction vehicle brake circuit.

4. A valve according to claim 3, wherein a further diaphragm is slidably mounted on the plunger and subdivides the chamber into chambers connected with their respective traction vehicle brake circuits.

5. Compressed air brake mechanism for traction vehicles adapted to haul trailers, wherein the mechanism comprises an automatic regulating valve according to any of the preceding claims, interposed between the compressed air reservoir for braking the trailer which is mounted on the traction vehicle and the trailer brake service delivery conduit, the said valve being operated by the traction vehicle brake circuit and being responsive to the pressure in the trailer brake service delivery conduit.

6. Automatic regulating valve for compressed air brake mechanism for traction vehicles for hauling trailers, substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

7. Compressed air brake mechanism for traction vehicles for hauling trailers, substantially as described and shown on the accompanying drawings.

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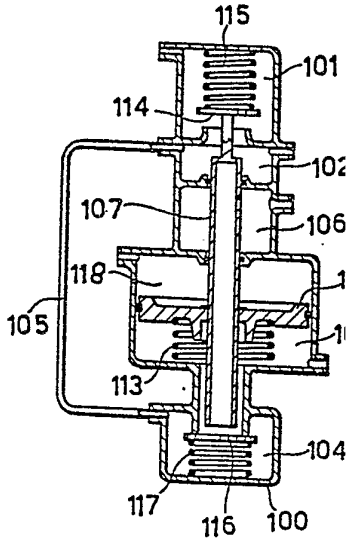
Fig. 1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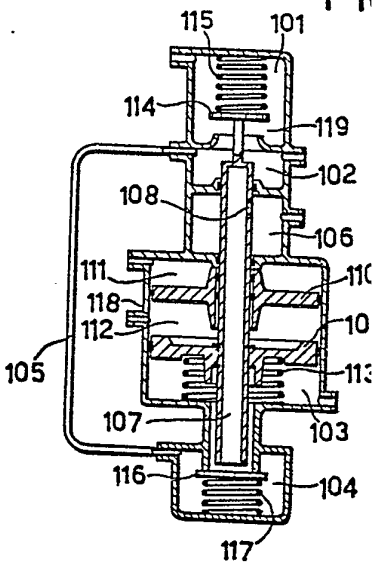
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1062223 COMPLETE SPECIFICATION
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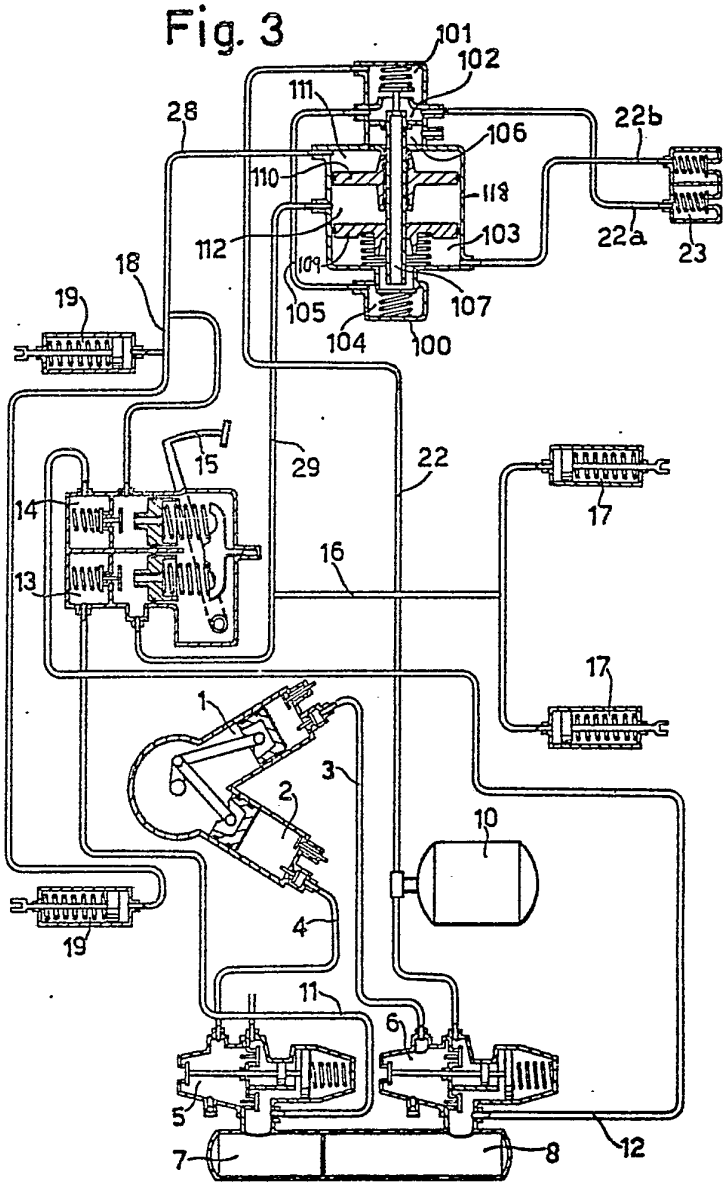
Sheets 1 & 2

Fig. 3



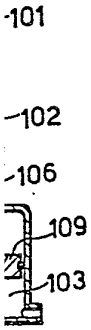


Fig. 2

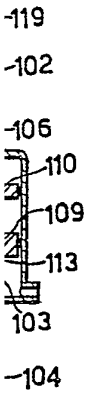


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Fig. 1

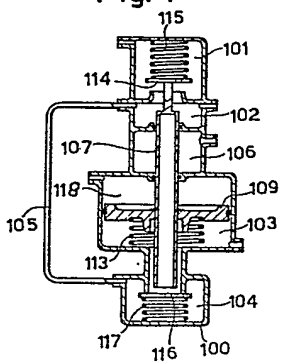

Fig. 2

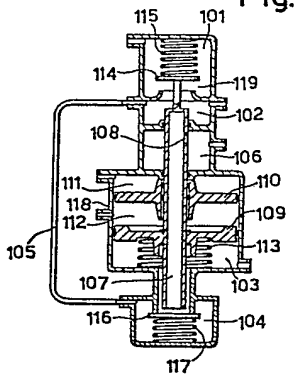

Fig. 3