F. J. CHAPSAL & A. L. E. SAILLOT.

ACCELERATOR FOR CONTINUOUS PNEUMATIC BRAKES.

APPLICATION FILED DEC. 2, 1907.

929,551. Patented July 27, 1909.

Fig. 1

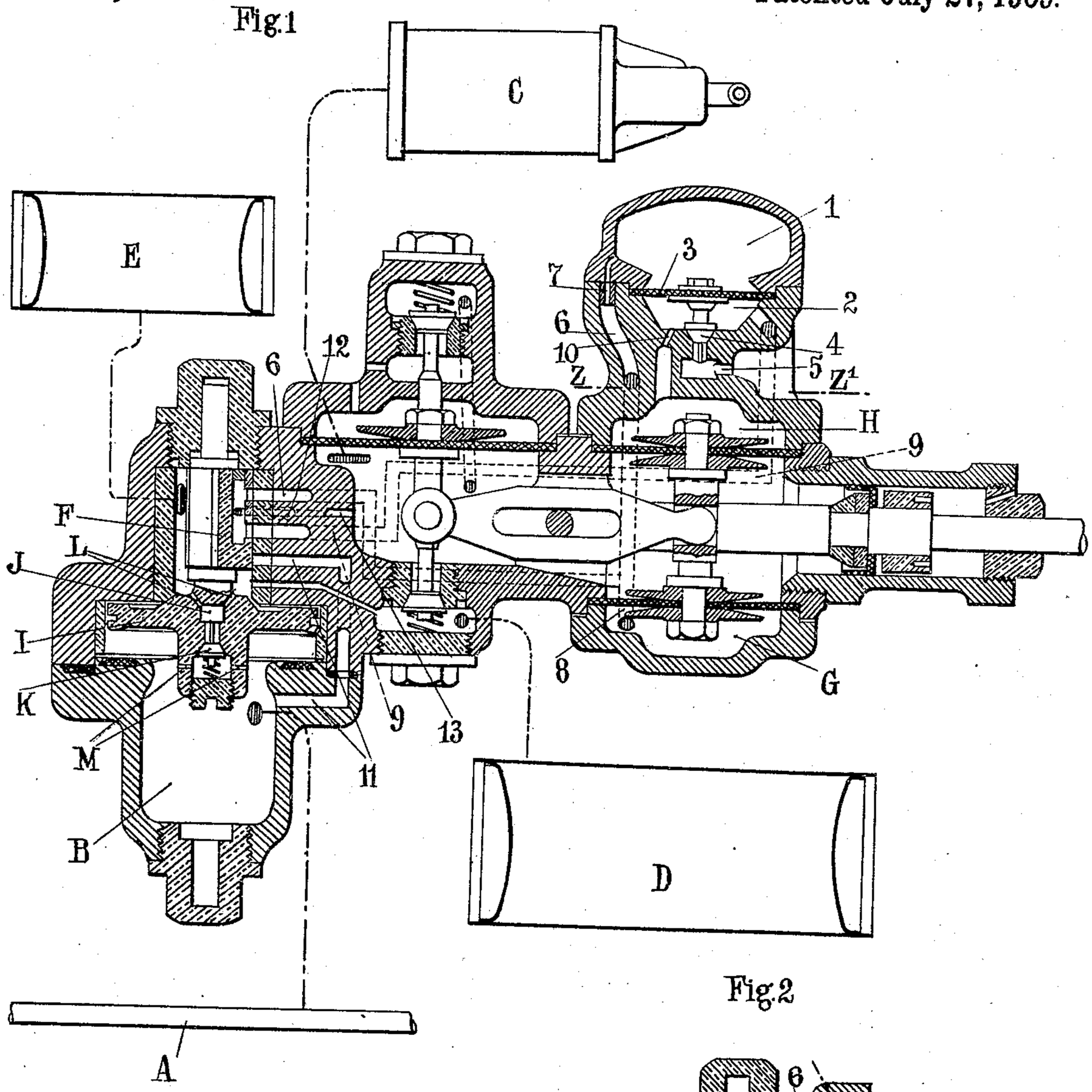


Fig. 2

Fig. 3

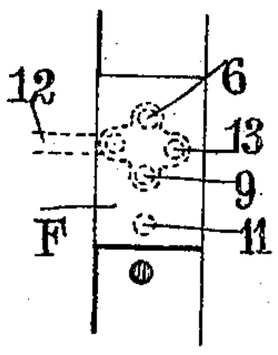
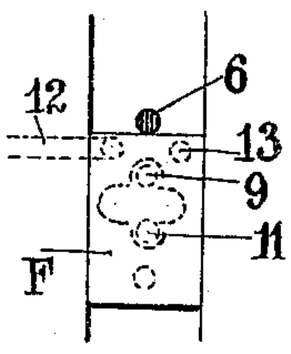


Fig. 4



WITNESSES

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FRANCOIS JULES CHAPSAL, OF PARIS, AND ALFRED LOUIS EMILE SAILLOT, OF COLOMBES, FRANCE.

ACCELERATOR FOR CONTINUOUS PNEUMATIC BRAKES.

No. 929,551. Specification of Letters Patent. Patented July 27, 1909.

Application filed December 2, 1907. Serial No. 404,781.

To all whom it may concern:

Be it known that we, FRANCOIS JULES CHAPSAL, residing in Paris, and ALFRED LOUIS EMILE SAILLOT, residing in Colombes, (Seine,) France, both citizens of the Republic of France and engineers, have invented certain Improvements in and Relating to Accelerators for Continuous Pneumatic Brakes, for which we have obtained a French patent, 11th December, 1906, (not yet issued,) of which the following is a specification.

This invention relates to a brake application accelerator for continuous pneumatic brakes, by means of which rapid application of the brakes is obtained in ordinary running stoppages, by means of a slight variation of pressure in the train pipe which is transmitted rapidly by short intervals as far as the rear of the train.

The principal characteristic of this accelerator consists in the utilization, upon each vehicle, of the pressure of the train pipe itself, for producing (as soon as the first distributer is actuated) a fresh, fixed variation of the pressure in the said pipe which renders the distributer of the following vehicle operative, and at short intervals all those which follow, as far as the last vehicle. This fixed variation of pressure in the train pipe results from the momentary opening beneath each vehicle of an orifice placing a chamber, which is then connected with the train pipe, in communication with the atmosphere; this orifice is normally closed by a valve or slide actuated, at the moment at which the distributer of the brake is rendered operative, by a diaphragm or piston which is then subjected on one side to the pressure of the train pipe, and on the other side to that of a chamber of given volume in which there expands slowly the air of a special reservoir charged at the pressure of the train pipe before the distributer is rendered operative. The duration of the expansion of the air in the said chamber regulates the amount of variation in pressure produced in the train pipe, while when the brakes are released this diaphragm or piston is no longer subjected to any pressure, its two faces being then placed in communication with the atmosphere by the play of the slide of the ordinary distributer of the brake.

This accelerator is represented in the accompanying drawing by way of example combined with the Chapsal-Saillot brake distributer which is described in other French patents.

Figure 1 of this drawing is a longitudinal section of the Chapsal-Saillot distributer, combined with the accelerator, the brakes being released. Fig. 2 represents a partial longitudinal section of the same assemblage during braking. Figs. 3 and 4 illustrate the positions of the slide valve of the distributer during running, with brakes released, and during braking respectively, and explain the operation of this part.

The accelerator proper is represented in the upper right hand portion of Fig. 1, situated above the line Z Z'.

Referring now to Figs. 1 and 2, A is the train pipe extending throughout the entire length of the train; B is the Chapsal-Saillot distributer; C is the brake cylinder; D is the braking reservoir; and E is the regulating reservoir of the Chapsal-Saillot brake. E also serves in this example as special slow-expansion reservoir for the operation of the accelerator.

The accelerator comprises two chambers 1 and 2 separated by a diaphragm or piston 3 solid with a valve 4 which may be replaced by a slide valve, and which in lifting, places the chamber 2 in communication with the atmosphere through the passage 5. The chambers 1 and 2 each communicate through separate passages with the distributing face of the slide valve F of the distributer. The chamber 1, through the port 6, which is restricted at 7, and from which a branch proceeds from 8 toward the chamber G of the distributer; and the chamber 2 through the port 9. The latter chamber also communicates through a passage 10 of reduced cross section with the chamber H of the distributer.

The lower part of the piston I of the distributer comprises a small chamber J closed by a valve K which opens downward and which is normally held upon its seat by a spring, the pressure of which may be regulated at will by the screw threaded plug upon which it is placed; small ports L place the top of the piston I in communication with this chamber J; and the under side of the valve K communicates with the bottom of the piston I through passages M.

As is known in this Chapsal-Saillot distributer the port 11 places the bottom of the

piston I, that is to say the train pipe, in communication with the face of the slide; the port 12 is open to the atmosphere; the port 13 communicates with the interior of the moderator, that is to say with the brake cylinder.

All the parts being in the position represented in Fig. 1 the air of the train pipe supplies the two reservoirs D and E in the known manner. Fig. 3 shows that at this moment the slide F by means of its central cavity places the ports 6, 13 and 9 in communication with 12, that is to say with the atmosphere; it follows from this that the chambers 1 and 2 of the accelerator and those of the moderator and also the brake cylinder are at atmospheric pressure. Figs. 1 and 3 also show that the port 11 is obturated by the slide valve. If therefore a partial reduction of pressure just sufficient for depressing the piston I but insufficient for actuating the distributer of the following vehicle, is formed in the train pipe A, the following result is produced:—The piston I being depressed, the slide valve F assumes the position represented in Figs. 2 and 4; the port 11 is then placed in communication through the cavity of the slide valve with the port 9, the air of the train pipe at once enters the chamber 2 of the accelerator and only supplies the chamber H through the restricted passage 10. The air from the reservoir E which passes through the port 6 (which is also uncovered by the slide valve F), in order to enter the chamber 1 and expand there is obliged to pass through the restriction 7; it also has to supply the chamber G of the moderator through the branch 8. Under these conditions the chamber 2 is for a certain time at a greater pressure than the chamber 1; the diaphragm 3 and its valve 4 are therefore lifted and the air is discharged from the train pipe into the atmosphere through the port 5 until equilibrium is reëstablished between the chambers 1 and 2. The time which thus elapses is sufficient to allow a supplementary partial reduction of pressure to be produced in the train pipe and cause the distributer of the following vehicle to act and this acts similarly as regards the distributer adjacent to it, and so on from one to the other, as far as the last vehicle.

The procedure is obviously the same if originally a greater reduction of pressure is produced in the train pipe than is sufficient for applying the brakes of the first vehicle. Nevertheless if this reduction, increased by that produced in the accelerator should become greater than is desirable for producing the maximum braking effect on the said vehicle, the difference of pressure between the train pipe and the regulating reservoir might uselessly become too great if the valve K did not intervene. However this valve K opens as soon as the difference of pressure between the train pipe and the regulating reservoir is greater than the action of the spring which applies this valve to its seat. The air of the reservoir is discharged into the train pipe until the difference of pressure which has been decided upon as the maximum is reëstablished between the pressures in the reservoir and in the train pipe, from which point the valve K again closes.

The present description is applicable to the combination of the accelerator to the Chapsal-Saillot brake, but it is obvious that this arrangement might equally well be combined with any pneumatic brake, such as the Westinghouse brake for example. In this case it is only necessary to arrange the triple valve in such a manner that as soon as its piston is depressed the air of a special reservoir is able to enter the chamber 1 of the accelerator through a passage of small section; the chamber 2 being at the same moment placed in communication with the train pipe through a passage of larger section. These two chambers should also be placed in communication with the atmosphere again as soon as the triple valve piston has resumed its released position.

What we claim and desire to secure by Letters Patent of the United States is:—

1. In an air brake system a distributer and an accelerator actuated thereby, said accelerator comprising two independent chambers separated by a diaphragm, one of said chambers having a passage to atmosphere and a valve controlled by said diaphragm normally closing said passage, in combination with independent passages for compressed air by which said accelerator is operated leading to said distributer, a slide valve actuated by the distributer valve piston, controlling said passages and means in connection therewith for opening both of said passages to atmosphere, substantially as described.

2. In an air brake system a distributer and an accelerator actuated thereby, said accelerator comprising two independent chambers separated by a diaphragm, one of said chambers having a passage to atmosphere and a valve controlled by said diaphragm normally closing said passage, in combination with a reservoir at the pressure of the train pipe and means in connection with the distributer for opening the train pipe to the chamber having a passage to atmosphere, and the reservoir to the other chamber of said accelerator, together with means to temporarily vary the resulting pressure in said chambers whereby the passage to atmosphere is temporarily opened and the pressure in the train pipe reduced.

3. In an air brake system the combination

of a distributer for compressed air brakes with an accelerator actuated by said distributer, said accelerator comprising two independent chambers, separated by a diaphragm, one of said chambers having an outlet to atmosphere and a valve controlled by said diaphragm normally closing said outlet, a passage from said chamber to the distributer, a passage of less capacity from the other chamber to said distributer, a reservoir at the pressure of the train pipe and a passage therefrom to the distributer, together with a valve operated by said distributer valve piston, a passage from the train pipe to said valve and means in connection with the movement of said valve by the distributer to open the passage from said reservoir to the passage of less diameter leading to one chamber of the accelerator and to open the passage from the train pipe to the passage leading to the other chamber, whereby a difference in pressure in said chambers is created, the valve closing the outlet to atmosphere is opened by the resulting movement of the diaphragm and the train pipe is thus opened to atmosphere, substantially as and for the purpose described.

4. In a distributer for compressed air brakes, a piston valve subjected on one face to pressure from the train pipe and on the other side to pressure from a reservoir, in combination with a supplementary valve in said piston valve opening into the train pipe chamber from the reservoir and means to hold the same to its seat against a predetermined higher pressure in the reservoir, substantially as and for the purpose described.

5. An accelerator for air brakes comprising a chamber with a passage to atmosphere and means for bringing said chamber into communication with the train pipe upon the setting of the brakes, a reservoir at substantially train pipe pressure, a second chamber and a passage thereto from said reservoir adapted to be simultaneously opened, means for temporarily varying the pressure in said chambers upon the simultaneous opening thereto of the train pipe and reservoir respectively, in combination with a valve controlling the said passage to atmosphere and means operated by the difference in pressure in said chambers for opening said valve during the continuation of said difference in pressure, whereby the pressure in the train pipe is lowered and the setting of the brakes accelerated, together with means for opening said chambers to atmosphere upon the release of the brakes.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses.

FRANCOIS JULES CHAPSAL.
ALFRED LOUIS EMILE SAILLOT.

Witnesses:
LÉON FRANCKEIRS,
MILTON B. KIRK.