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

BRAKING REGULATOR.

APPLICATION FILED MAY 9, 1905.

Fig. 1

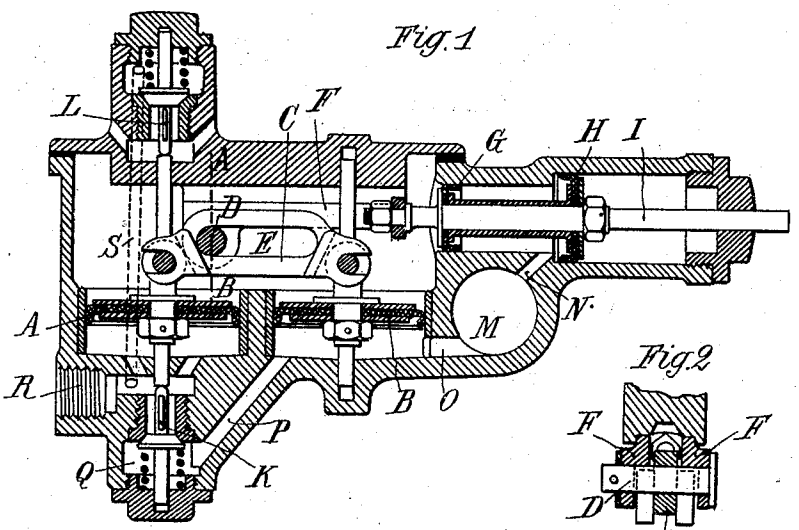


Fig. 2

Fig. 3

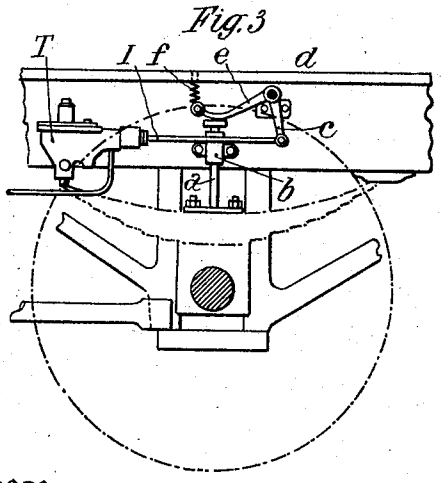
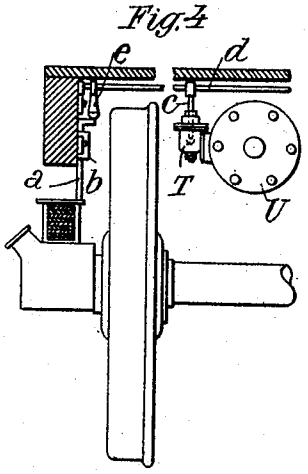


Fig. 4



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BRAKING-REGULATOR.

No. 800,358. Specification of Letters Patent. Patented Sept. 26, 1905.

Application filed May 9, 1905. Serial No. 259,616.

To all whom it may concern:

Be it known that we, FRANÇOIS JULES CHAPSAL, engineer, residing at 37 Rue St. Petersbourg, Paris, and ALFRED LOUIS EMILE SAILLOT, engineer, residing at 61 Rue de la Pointe, La Garenne-Colombes, Seine, France, citizens of the Republic of France, have invented a Braking-Regulator, (for which we have obtained a French patent of addition dated May 5, 1904, not yet issued,) of which the following is a specification.

The present invention has for its object a braking-regulator of the variable-arm-beam type, which is influenced by the load and in which the pivot of the beam is not fixed during the braking, but is, on the contrary, capable of displacement along this beam, but during braking only in order to avoid wear, in such a manner as to regulate at any moment the length of the lever-arm of the beam—that is to say, the admission and the discharge of the air of the brake-cylinder in agreement with the real and momentarily-variable loads supported by the axle and which result from the fact that the sudden reduction of the vis viva of the vehicles produced by the application of the brakes produces a temporary and variable increase of the load carried by the front axle and a corresponding reduction of that on the rear axle. In this special type of variable-arm-beam braking-regulator the valve for the discharge of the air of the brake-cylinder which exhausts this air directly into the atmosphere is controlled, like the admission-valve, by the rocking movement of the beam and the difference of pressure acting upon the pistons fixed to the extremities of this beam in such a manner that its opening and closing are regulated in the same way as those of the admission-valve.

Figure 1 is a longitudinal section of the load-regulator. Fig. 2 is a section on the line A B. Figs. 3 and 4 show in elevation and in cross-section, respectively, a method of mounting the said part; at the same time they represent the movement for the transmission of the variations of pitch of the vehicle-springs.

The regulator comprises, Fig. 1, two pistons A and B, the rods of which are attached to the two extremities of the beam C, the total length of which is fixed and which rocks around a movable pivot D, sliding in the groove E of the beam. The pivot D is rigidly connected with the part F, the displacements of which take place solidly with those of the differential pistons G and H, mounted upon the same rod *l* which is itself submitted to the variations of pitch of the suspension-springs by the intermediary of the transmission movement hereinafter described. The part F slides and constantly bears in a projection cast upon the lid of the apparatus, Fig. 2. The rods of the two pistons A and B each slide at their extremities in cylindrical holes which serve to guide them. The extremities of the rod of the piston A are alternately able to strike against the valves K and L, which they then lift. The air coming from the braking-reservoir by the intermediary of the distributer enters at M. The passage N conducts this air into the space comprised between the two differential pistons G and H, the conduit O conducts it beneath the piston B, and the conduit P into the chamber Q beneath the valve K.

The orifice R leads to the brake-cylinder and the passage S places this cylinder in constant communication with the top of the valve L. The bottom of this latter valve is in permanent communication with the atmosphere.

In Figs. 3 and 4, T is the load-regulator. U is the brake-cylinder. *a* is a rod that slides in a guide *b* and bears constantly upon the upper part of the axle-box. The rod I of the two differential pistons of the regulator is connected to the lever *c*, keyed upon a transverse shaft *d*, extending throughout the length of the vehicle, Fig. 4, and comprising at each extremity a crank *e*, which rests upon the upper extremity of the rod *a*. The spring *f* tends to raise the crank *e*. Its action is in opposition to that of the differential pistons G and H, which, on the contrary, tend to depress this same crank when they are under pressure.

When the air coming from the braking-reservoir reaches M, Fig. 1, it first of all actuates the differential pistons G and H, and by the intermediary of the device described, Figs. 3 and 4, applies the crank *e* to the upper part of the axle-box. The length of stroke of the differential pistons, and consequently the displacement of the pivot D, are therefore in inverse ratio to the load upon the axle.

If the axle-load corresponds to the maximum that it is able to reach, the pivot D is arrested at the middle point of the length of the groove in such a manner that the two

lever-arms of the beam are equal. If the vehicle is empty, the pivot goes as far as the other end. The air reaching M from the distributer then penetrates beneath the piston B and into the chamber Q. The piston B lifted by the air causes the beam to pivot around D, which is automatically arranged in the position appropriate to the load on the axle, the piston A descends and lifts the valve K, which thus permits air to enter at R and thence to reach the brake-cylinder. When the pressure in the brake-cylinder—that is to say, beneath A—has become of an inverse ratio to the lengths of the arms of the beam C relatively to those acting beneath B, the piston A returns to its position of equilibrium and the valve K closes. The brakes are then applied proportionately to the axle-load. If the pressure decreases in M, that previously admitted to the cylinder becomes proportionately stronger, the piston A is lifted, and the valve L, which is itself pressed, permits of the escape into the atmosphere of the air coming from the cylinder through the passage S until the pressures beneath A and B again become proportional. The release effected is therefore partially graduated and proportionate to the load upon the axle.

When the brakes are released by the distributer, the pressure in M and beneath B becomes equal to atmospheric pressure, and no pressure can exist beneath A without the beam C and the valve L being lifted, and thus placing the brake-cylinder in communication with the atmosphere. The brakes are released, and as the pistons G and H are no longer submitted to pressure they are no longer able to depress the cranks *e*. These latter are lifted by the spring *f*, and the fluctuations in the pitch of the suspension-springs are no longer transmitted to the parts of the regulator which remain at rest, wear of these parts being thus avoided.

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

1. A braking-regulator influenced by the weight of the vehicle, with a variable-arm beam, the admission and the discharge of air in this regulator being regulated at all times by the beam during braking, but during braking only, in agreement with the variations of the load, by means of a valve for the discharge of the air of the brake-cylinder, discharging this air directly into the atmosphere, this valve being controlled by the variable-arm beam in the same manner as the admission-valve.

2. A braking-regulator influenced by the weight of the vehicle, comprising a variable-arm beam for controlling the admission and the discharge of air in the regulator during braking, in agreement with the variations of the load, in combination with a valve, controlled by said variable-arm beam, for the discharge of the air of the brake-cylinder.

3. A braking-regulator influenced by the weight of the vehicle, comprising a variable-arm beam and differential pistons for automatically regulating the lengths of the arms of said beam at the moment of braking.

4. A braking-regulator influenced by the weight of the vehicle, comprising a variable-arm beam and differential pistons for automatically regulating the lengths of the arms of said beam at the moment of braking, in combination with a piston at each end of said variable-arm beam.

5. A braking-regulator influenced by the weight of the vehicle, comprising a variable-arm beam and differential pistons for automatically regulating the lengths of the arms of said beam at the moment of braking, in combination with a piston at each end of said variable-arm beam, one of said pistons adapted to operate a valve for supplying air to the braking-cylinder.

6. A braking-regulator influenced by the weight of the vehicle, comprising a variable-arm beam and differential pistons for automatically regulating the lengths of the arms of said beam at the moment of braking, in combination with a piston at each end of said variable-arm beam, one of said pistons adapted to operate a valve for the discharge of the air from the braking-cylinder.

7. A braking-regulator influenced by the weight of the vehicle, comprising a variable-arm beam, and a piston at each end of said beam, in combination with a valve operated by one of said pistons for supplying air to the braking-cylinder and a valve alternately operated for the discharge of the air from the braking-cylinder.

8. A braking-regulator influenced by the weight of the vehicle, comprising a variable-arm beam, and a piston at each end of said beam, in combination with means operated by one of said pistons for alternately supplying air to and discharging air from the braking-cylinder.

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

FRANÇOIS JULES CHAPSAL.
ALFRED LOUIS EMILE SAILLOT.

Witnesses:
LÉON CRANEKEN,
LOUIS LEMBRANS.