

G. WESTINGHOUSE, Jr.
Fluid-Pressure Regulator.

No. 225,898.

Patented Mar. 23, 1880.

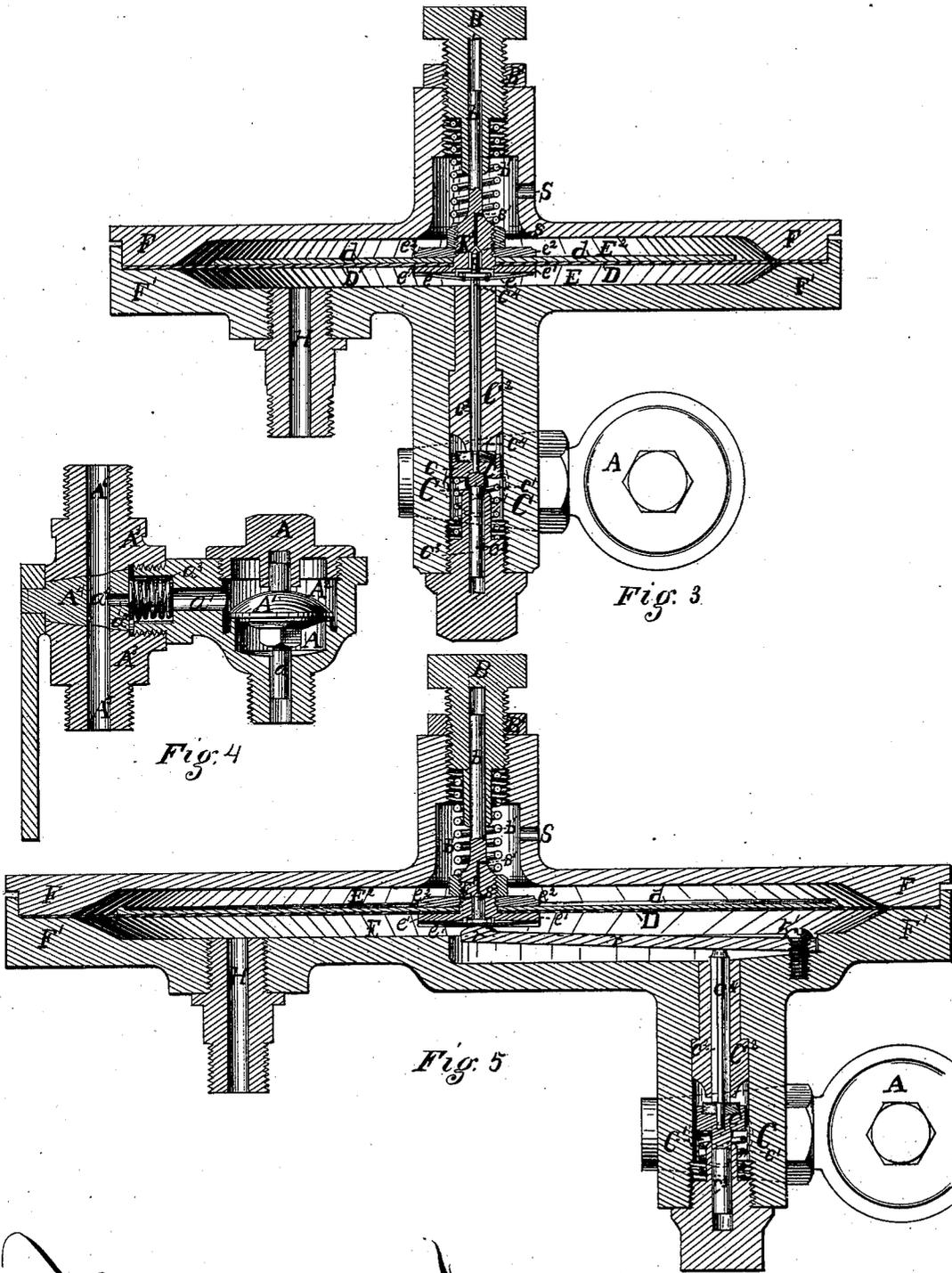


Fig. 4

Fig. 3

Fig. 5

Witnesses
O. L. Parker
R. A. Whittlesey

Inventor George Westinghouse Jr.
By *Attorney* George H. Christy

UNITED STATES PATENT OFFICE.

GEORGE WESTINGHOUSE, JR., OF PITTSBURG, PENNSYLVANIA.

FLUID-PRESSURE REGULATOR.

SPECIFICATION forming part of Letters Patent No. 225,898, dated March 23, 1880.

Application filed January 24, 1880.

To all whom it may concern:

Be it known that I, GEORGE WESTINGHOUSE, Jr., of Pittsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Fluid-Pressure Regulators; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1, Sheet 1, is a plan view illustrative of the arrangement of my improved regulator with an automatic air-pressure brake apparatus and a carbureter, the combined devices being designed for use in car-lighting. Fig. 2 shows, in enlarged view, a side elevation of the regulator with the check-valve chamber and stop-cock in front. Fig. 3, Sheet 2, is a vertical sectional view of the regulator in the plane of the line xx , Fig. 2. Fig. 4 is a like view through the stop-cock and check-valve chamber; and Fig. 5 is a view similar to Fig. 3, but showing a larger diaphragm and diaphragm-chamber, and a lever arrangement between the regulating-valve and diaphragm, as hereinafter described.

My present invention relates to an improved regulator designed for use as a part of an apparatus through which fluid is passed, and in which a pressure practically constant or subject to but slight variations is desired at the place where the fluid is to be used, while the supply-pressure is variable or liable to become variable, or even intermittent; and while I include as within the scope of my invention all the uses to which it is applicable, I have designed it chiefly as a regulator for carbureters in connection with a pump, fan, or other air-compressing apparatus by which air is compressed, and, under pressure, is passed through the carbureter.

The use I will first describe is that wherein the apparatus is used for car-lighting, the air for the purpose being taken from the air-brake pipes, or from a pump or reservoir on some part of the train.

In the diagram, Fig. 1, I have shown at P a section or part of an air-brake pipe; at R, the main reservoir, usually arranged on the locomotive; at R', an auxiliary reservoir, one such

being arranged on each car; at R², a brake-cylinder, and at V a triple valve, these devices being such as are in common use as parts of the Westinghouse automatic brake.

It is one of the peculiar features of this brake that the air-conduit or brake pipes P are always, when the train is running, or in running order, kept charged with compressed air, and for ordinary purposes of braking such pressure rarely varies more than from one to five per centum, and never need vary more than from ten to fifteen per centum as a maximum. At the same time my present inventions make provision for even greater variations where they occur.

From such an air-brake pipe I take a branch, P', to my improved regulator P², the details of which are shown in the other figures. The pipe P' opens into a valve chamber or case, A, Fig. 4, beneath a check-valve, A', which is of any convenient construction, except that its stem a does not entirely fill the bore of the nut in which it works; but by being flattened on one side, or grooved, or turned small, room is left for the air to flow past it in limited quantities, the maximum amount of such flow being a little more than the maximum exhaust or discharge at the place or places of use. By this means an approximate regularity in the amount of supply is maintained.

The air-pressure in chamber A raises this valve A', and air passes it to chamber A². The case inclosing this check-valve is screwed into the side of a stop-cock case, A³, having a plug or valve, A⁴, for opening and closing communication through its length. The plug A⁴ is held in position by a spring, a^3 . Passages a^1 and a^2 permit air to pass from chamber A² to the port or passage a^4 in the plug A⁴, and by properly shifting the plug an air-passage may be had to either or both ends of the stop-cock, as desired. The end A⁵ of this cock is connected by a pipe, T', with an air-reservoir, T, Fig. 1, the purpose of which will be presently described. The other branch or end, A⁶, screws into the case C of a chamber, C', and affords an air-supply passage to such chamber. Within this chamber is a regulating-valve, c , having, by preference, an elastic face, which is seated by a spring, c' , against the end of a bushing, C², and thereby closes a pas-

may bear against the side of a lever, *r*, Fig. 5, one end of which is secured by any suitable flexible connection to the case, as at *r'*, while its other end bears against the spring *e*. By this arrangement I lessen the range of motion of the regulating-valve *c* for a given movement of the diaphragm; but, at the same time, the effective power of the diaphragm, or rather of spring *b'* acting against the diaphragm to open the regulating-valve, is increased through the leverage obtained. This regulator may be secured in place, by preference, in the position shown in Fig. 2, by bolts passing through holes *o'* in the flange or plate *o*.

I have already stated that the branch or end *A*⁵ of the stop-cock is connected with an air-reservoir, *T*. This reservoir is, by preference, made of considerable capacity, and it is intended to supply compressed air to the carbureter during intermissions in the supply from the brake-pipe, which may likely occur. For this purpose I arrange the ports in the stop-cock as before described, so that by shifting the plug *A*⁴ air from the brake-pipe may pass either to the regulator or to the reservoir, or to both, or may be shut off from either or both, as desired.

By this arrangement the reservoir may be filled at any convenient time when such work will least interfere with the operation of the brakes or train, or, when lights are not required, the cock may be wholly closed, and thus waste be prevented.

If the supply from the brake-pipe should fail, or the pressure in such pipe should fall below the accumulated pressure in reservoir *T*, the plug *A*⁴ being in proper adjustment, then the excess of pressure in *T* would seat check-valve *A'*, and air would pass from the reservoir through the regulator *P*² to maintain the supply, so that this cock, with its ports leading to different sources of supply, in combination with such supplies and with the check-valve, constitute a regulator subordinate to and combined with the regulator *P*², by means of which the variations in the pressure of air which is supplied to the main regulator *P*² are practically confined within narrow limits, although pressure in the brake-pipes may vary considerably or at times cease. A steady and uniform flame can thus be secured at the burners, which, in car-lighting, is a matter attended with peculiar difficulties; and, furthermore, by combining and arranging this regulating apparatus in the manner described, I bring it in the line of air-supply before it reaches the carbureter, and thus I am enabled to use material in the flexible diaphragm which otherwise would be soon injured or destroyed by the carbureted air.

Instead of the brake-pipe *P*, any suitable air-supply or compressing mechanism may be

substituted, as a pump or fan, and the regulating apparatus herein described may, when desired, be used for other purposes than car-lighting.

I claim herein as my invention—

1. In a fluid-pressure regulator, the combination of a flexible diaphragm arranged across or inclosing the regulating-chamber, a valve adapted to open and close a supply-passage to such chamber, the stem of such valve abutting directly or indirectly against the diaphragm, but unconnected therewith, a spring, *b'*, arranged to resist pressure upon the diaphragm from within the regulating-chamber, and spring *c'*, arranged to move the valve to or toward its seat when spring *b'* is compressed, substantially as set forth.

2. In a pressure-regulator, a flexible diaphragm, *D*, having an escape-passage, *s'*, through the same, and spring *e* and valve *s*, attached thereto, such valve being adapted by movement of the spring to open and close the escape-passage, in combination with springs *b'* and *c'* and valve *c*, the latter having either direct or indirect contact with spring *e*, substantially as described, whereby the escape *s'* will be closed when valve *c* is open, and upon further compression of spring *b'*, after the seating of valve *c*, such escape will be opened.

3. The combination of diaphragm *D*, having an escape-passage, *s'*, through the same, spring *e*, attached to the inner face of the diaphragm, valve *s*, operated by spring *e*, valve *c*, having its stem abutting against spring *e*, and spring *c'*, adapted to compress spring *e* and close the escape when valve *c* is unseated, substantially as set forth.

4. The regulator *P*², having a stop-cock supply-passage leading thereto, such cock having a three-ported valve or plug, *A*⁴, in combination with reservoir *T*, communicating with one port of the valve, a brake-pipe or equivalent source of supply, *P*, communicating with another port of such valve, and check-valve *A'*, arranged in the line of communication between the brake-pipe and stop-cock valve, substantially as and for the purposes set forth.

5. The combination of cock *A*³, reservoir *T*, brake-pipe or supply *P*, and check-valve *A'*, the same constituting a subordinate regulator, as described, with main regulator *P*² and carbureter *H'*, the main regulator being arranged between the air-supply and the carbureter, substantially as set forth.

In testimony whereof I have hereunto set my hand.

GEORGE WESTINGHOUSE, JR.

Witnesses:

R. H. WHITTLESEY,
C. L. PARKER.



J. A. WERNER.
Attachment to Corn-Planters.

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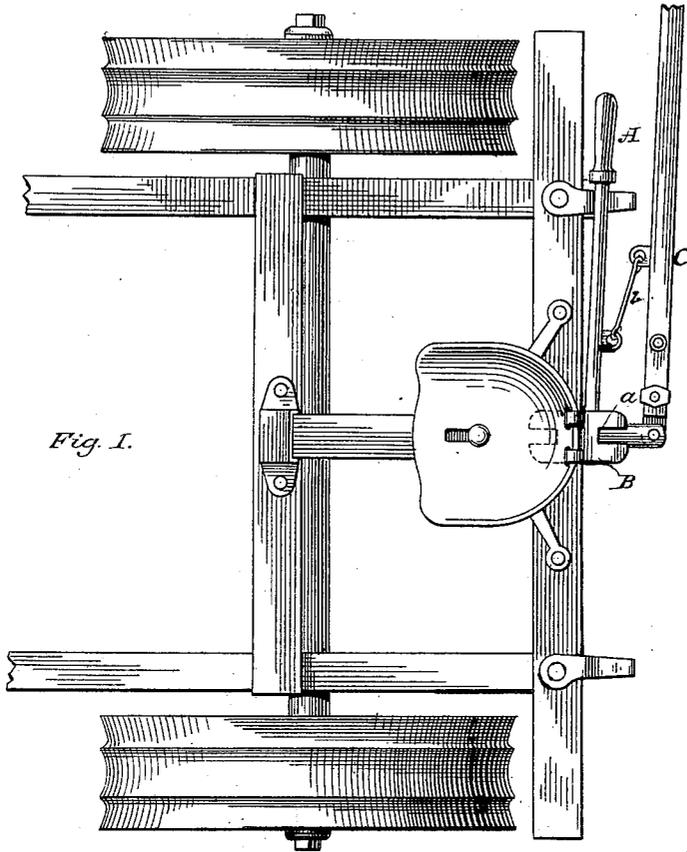


Fig. 1.

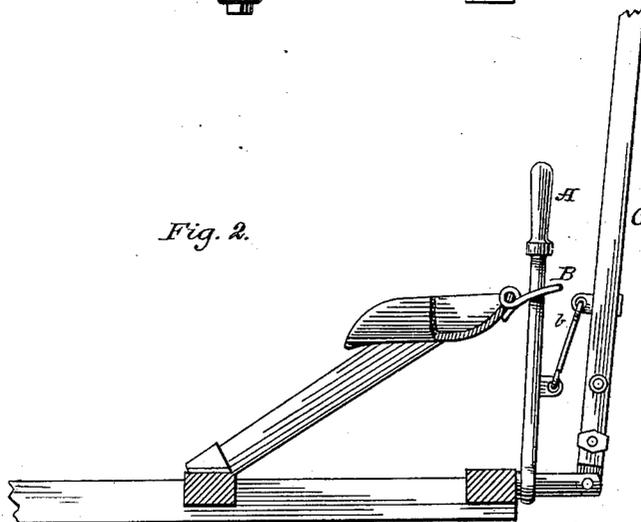


Fig. 2.

Attest:

Clarence Poole

L. W. Sulley

Handwritten signature

Inventor:

John A. Werner,

by Eli Spear Atty