No. 751,434. PATENTED FEB. 2, 1904.

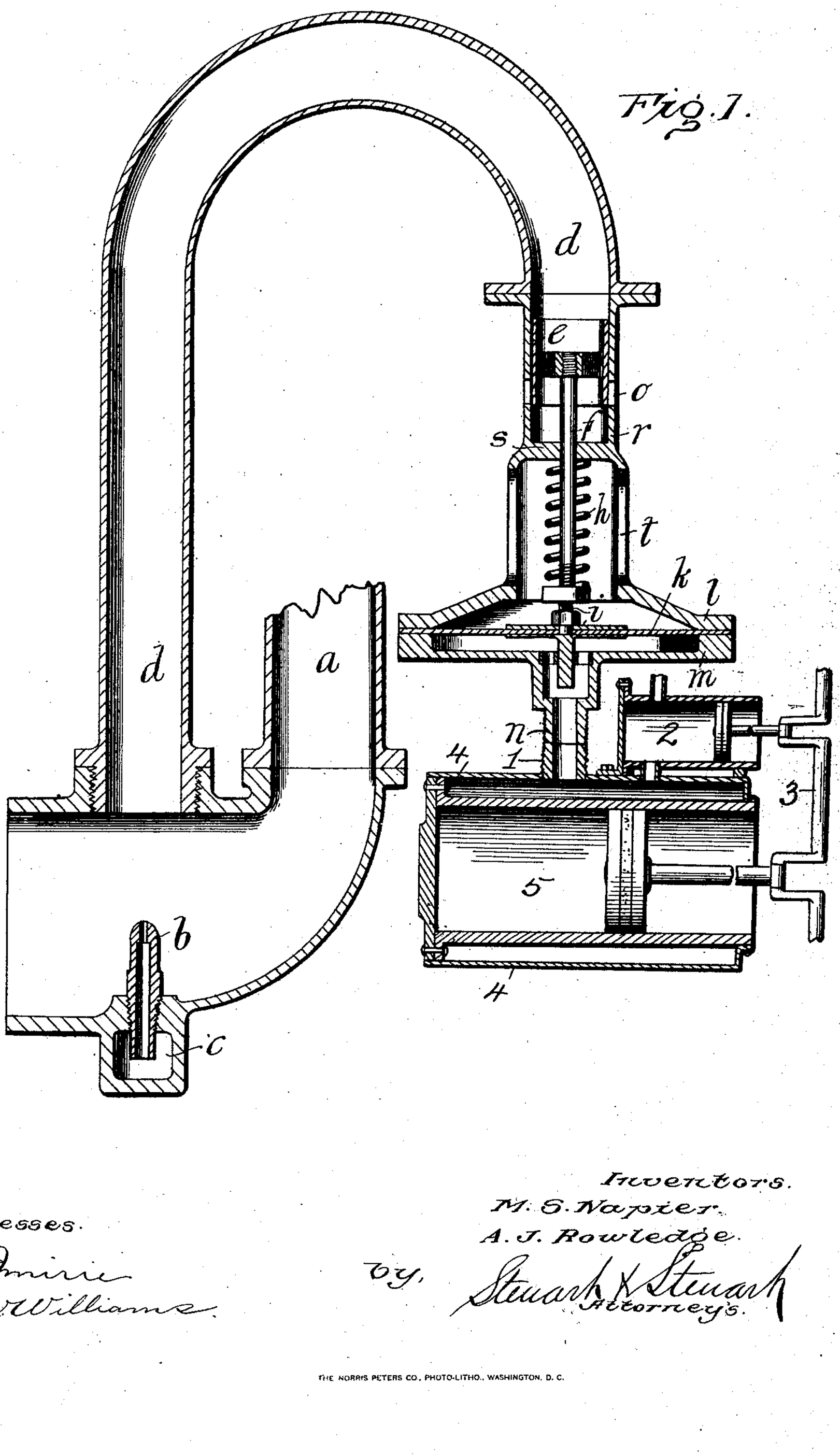
M. S. NAPIER & A. J. ROWLEDGE.

CARBURETER FOR PETROL MOTORS.

APPLICATION FILED SEPT. 26, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.



Witnesses.
Jno. Imrie
W. A. Williams.

Inventors.
M. S. Napier.
A. J. Rowledge.
by Stuart & Stuart
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NO MODEL. 3 SHEETS—SHEET 2.

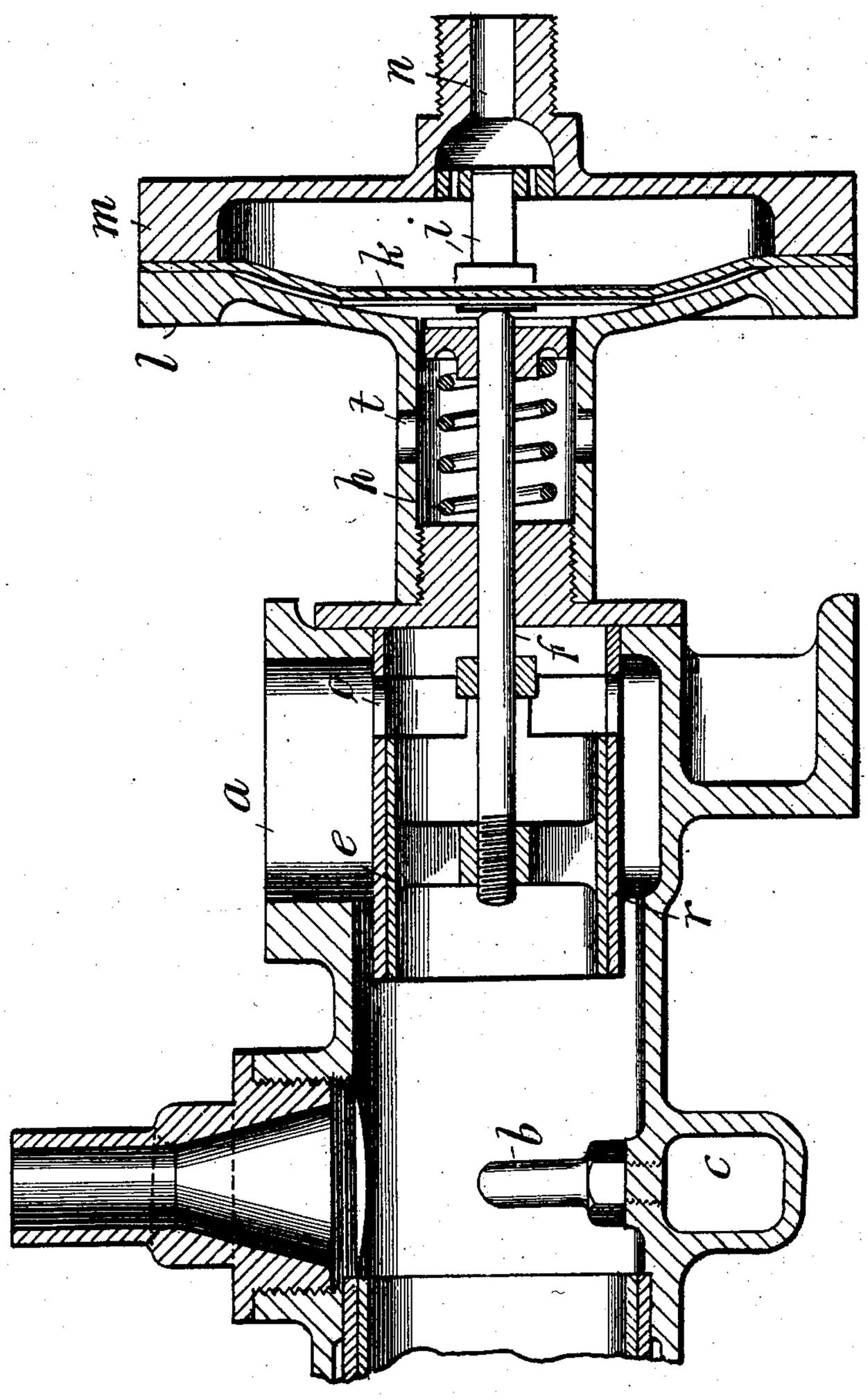

Fig. 2.

Witnesses.
Jno. Imrie
W. A. Williams

Inventors.
M. S. Napier.
A. J. Rowledge.
By Stuart & Stuart
Attorney's.

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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 3.

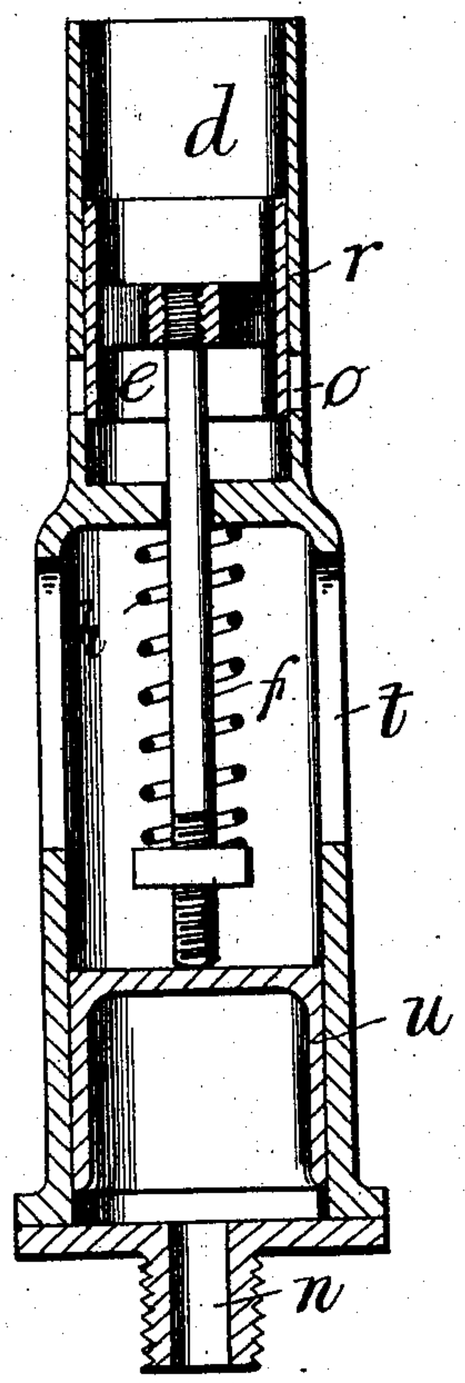
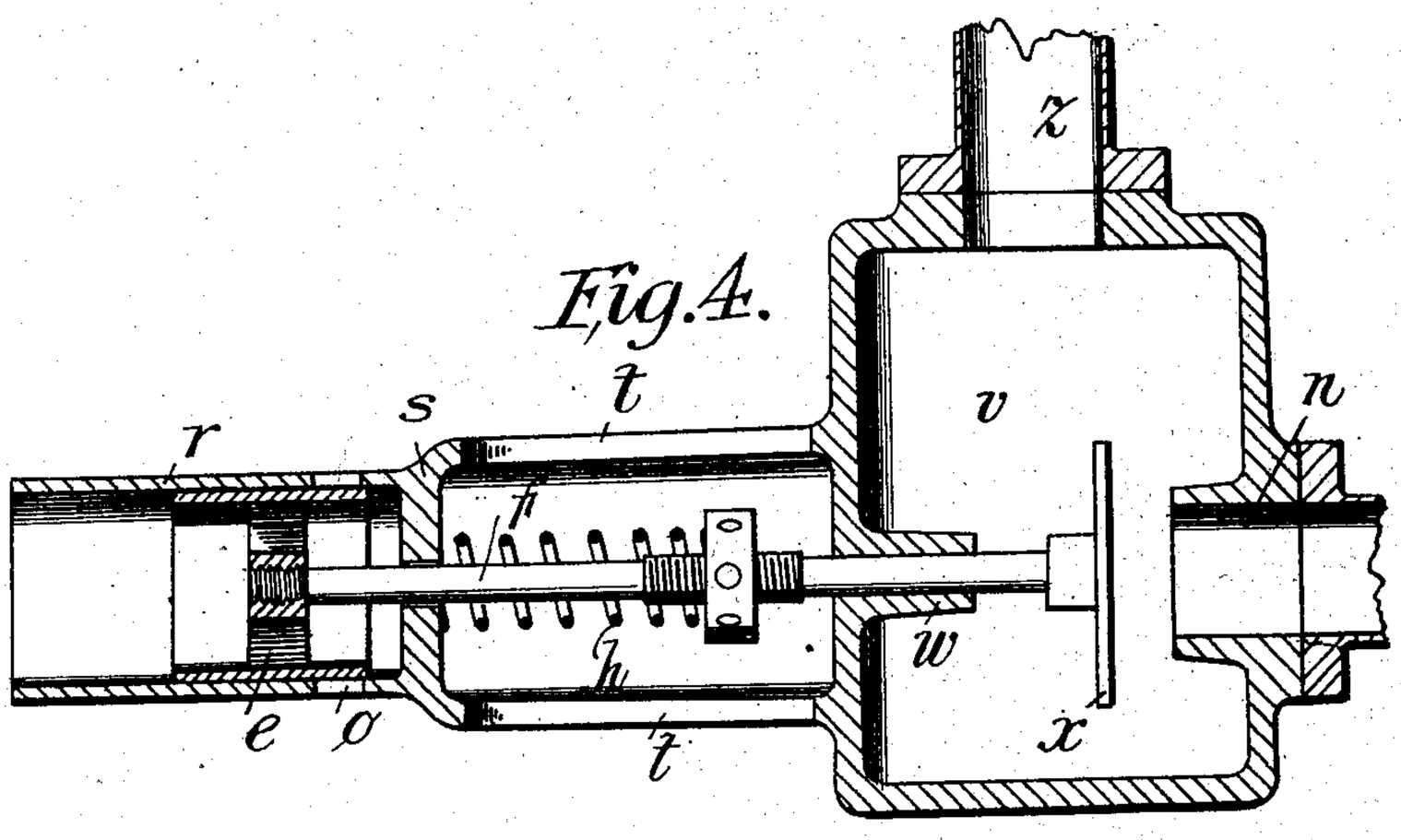


Fig. 4.



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No. 751,434. Patented February 2, 1904.

UNITED STATES PATENT OFFICE.

MONTAGUE S. NAPIER AND ARTHUR JOHN ROWLEDGE, OF LONDON, ENGLAND; SAID ROWLEDGE ASSIGNOR TO SAID NAPIER.

CARBURETER FOR PETROL-MOTORS.

SPECIFICATION forming part of Letters Patent No. 751,434, dated February 2, 1904.

Application filed September 26, 1903. Serial No. 174,790. (No model.)

To all whom it may concern:

Be it known that we, MONTAGUE STANLEY NAPIER and ARTHUR JOHN ROWLEDGE, subjects of the King of Great Britain, and residents of Vine street, York Road, Lambeth, London, S. E., England, have invented certain new and useful Improvements in Carbureters for Petrol-Motors, (for which we have made application for Letters Patent in Great Britain, No. 5,981, dated March 14, 1903, and in Germany, dated May 16, 1903,) of which the following is a specification.

This invention relates to improvements in carbureters for use in connection with petrol-motors, and is especially applicable to automobiles. With the usual arrangements in these motors where air is drawn into the cylinder through a carbureter if the air valve and passages are so arranged as to admit air in the best proportion for the explosive mixture when the motor is running at any particular speed it is found that when the speed is increased the proportion of air in the explosive mixture is usually too small.

The object of the present invention is to enable the automatic adjustment of the air-supply to be readily effected in an advantageous manner.

The invention consists in a form of regulating device in which the air-supply is automatically controlled by means of a diaphragm or piston which is exposed on one side to the atmospheric pressure and on the other side to a pressure greater or less than the atmospheric by an amount which varies with the speed of the motor, such pressure difference being obtained from the pressure difference at a point in the jacket-water circulation.

Referring to the accompanying drawings, Figure 1 is a sectional elevation of one form of the apparatus. Fig. 2 is a similar view of another form. In these two forms the air-supply is controlled by the movements of a diaphragm. Fig. 3 shows a form in which the control is effected by means of a piston. Fig. 4 shows a form in which a disk connected to the air-valve is subjected to the pressure of the inflowing water.

In the apparatus shown in Fig. 1 the main air-supply is drawn into the carbureter through a pipe *a*, passing over a nozzle *b*, screwed into the pipe and communicating with a pocket *c*, to which the petrol is supplied. The petrol from the nozzle *b* is taken up by the air in the usual way. A pipe *d* for an additional air-supply is connected as shown, this air-supply being controlled by a piston-valve *e*, the spindle *f* of which is pressed by the spring *h* against a stud *i*, secured to the center of the diaphragm *k*. This diaphragm *k* is secured between the two parts *l* and *m* of a casing. A water-inlet *n* is provided on the part *m*, to which a pipe 1 may be connected, leading to the delivery-pipe of a pump 2, driven from the motor-shaft 3. The pressure of delivery of this pump, which supplies cooling water to the jacket 4 of the motor-cylinder 5, consequently varies with the speed of the motor, and these pressure variations are transmitted to the under side of the diaphragm *k*. The upper portion *l* of the casing is extended upward as a cylinder *r*, divided into two portions by a partition *s*. Openings *t* below this partition place the upper side of the diaphragm in communication with the atmosphere. The piston-valve *e* is adapted to work in the upper portion of the cylinder *r* and to admit air to the pipe *d* through ports *o* when the valve *e* is raised by an increase of pressure below the diaphragm, the amount of opening of the ports *o* being proportional to the increase of pressure. The proper proportion of air in the explosive mixture is thus maintained.

In the form shown in Fig. 2 the main air admission takes place around the cylinder *r*, in which the valve *e* works, the auxiliary air entering through ports *o*, as before.

In the form shown in Fig. 3 a piston *u* is substituted for the diaphragm *k*, the arrangement being otherwise the same as that shown in Fig. 1.

Fig. 4 shows a form of the apparatus in which the spindle *f* of the valve *e* passes through a sleeve *w* into a chamber *v* and carries a disk *x*, water being admitted to the chamber *v* through the inlet *n*, opposite which the disk *x* is disposed. The water escapes from the chamber *v* through the pipe *z*. The

disk *x* takes up a position in accordance with the rate of inflow of water through the pipe *n*, and the air admission is, as in the previous cases, controlled by the valve *e* and the ports *o*.

By means of this device the proportion of air in the charge is automatically adjusted in accordance with the speed of the motor.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an apparatus for controlling the admission of air to the carbureter of an internal-combustion engine, the combination of an element subjected to the pressure of the cylinder-cooling water, a valve-spindle, a spring holding the spindle in contact with the said element, a valve carried by the spindle, and air-admission ports controlled by the said valve, whereby the said ports are opened when the pressure of the cooling water increases, substantially as set forth.

2. In an apparatus for controlling the admission of air to the carbureter of an internal-combustion engine, the combination of a diaphragm, a casing containing the diaphragm, a pipe connecting the casing to a point in the cylinder-cooling water-pipes, a valve-spindle, a spring pressing the valve-spindle against the diaphragm, a valve carried by the spindle, and air-admission ports controlled by the valve, whereby the said ports are opened when the pressure of the cooling water increases, substantially as described.

3. In an apparatus for controlling the admission of air to the carbureter of an internal-combustion engine, the combination of a piston, a cylinder, a pipe connecting the cylinder to a point in the cylinder-cooling water-pipes, a valve-spindle, a spring pressing the valve-spindle against the piston, a valve carried by the spindle, and air-admission ports controlled by the valve, whereby the said ports are opened when the pressure of the cooling water increases, substantially as described.

4. In an apparatus for controlling the admission of air to the carbureter of an internal-combustion engine, the combination of a casing, a pipe through which water is led to the casing, an element arranged opposite to the water-inlet, a spindle carrying the said element, a spring holding the spindle in position, a valve carried by the spindle, air-admission ports controlled by the valve, and a pipe through which the water escapes from the casing, substantially as described.

In witness whereof we have hereunto set our hands in presence of two witnesses.

MONTAGUE S. NAPIER.
ARTHUR JOHN ROWLEDGE.

Witnesses:
FREDK. A. DANIEL,
BERTRAM H. MATTHEWS.