(No Model.)

E. J. FROST.

TEMPERATURE REGULATOR FOR CARBURETORS.

No. 363,324. Patented May 17, 1887.

Fig. 1.

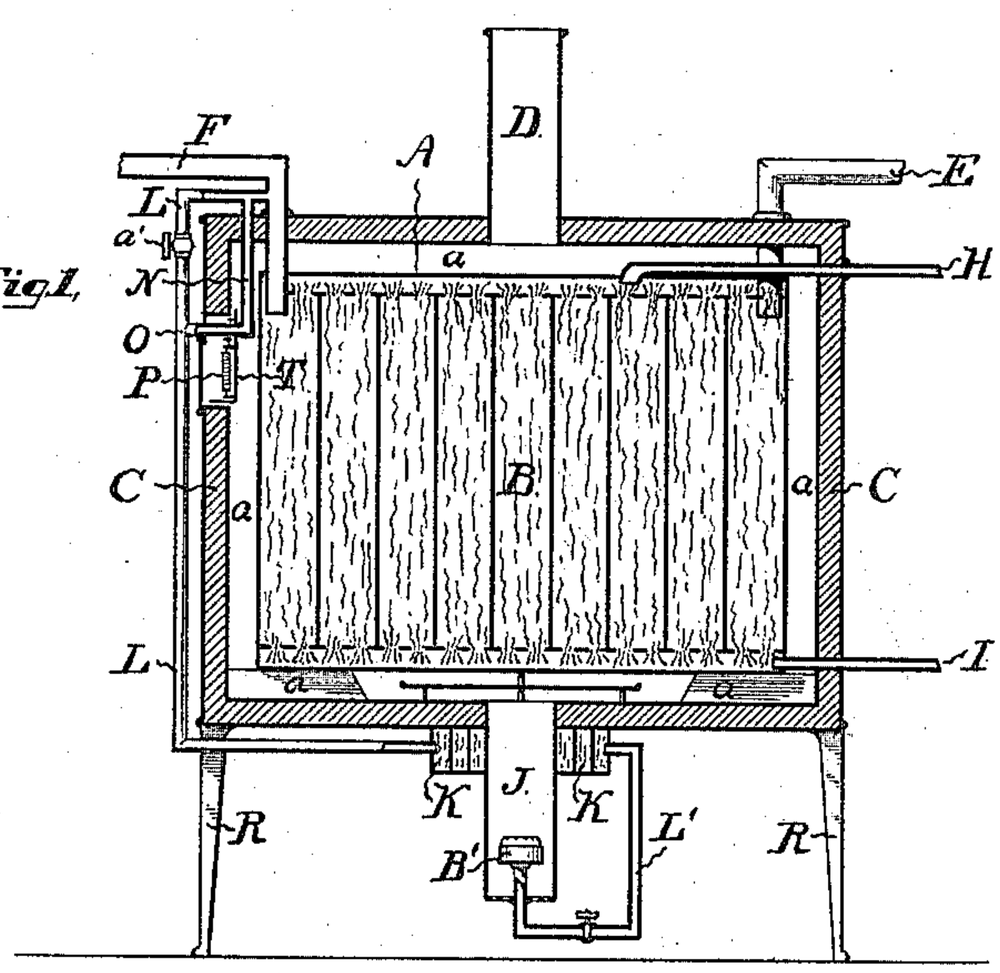

Fig. 2.

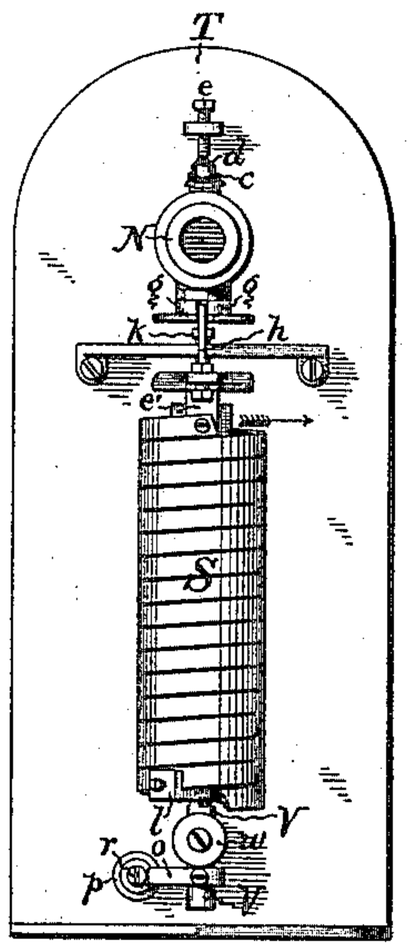

Fig. 3.

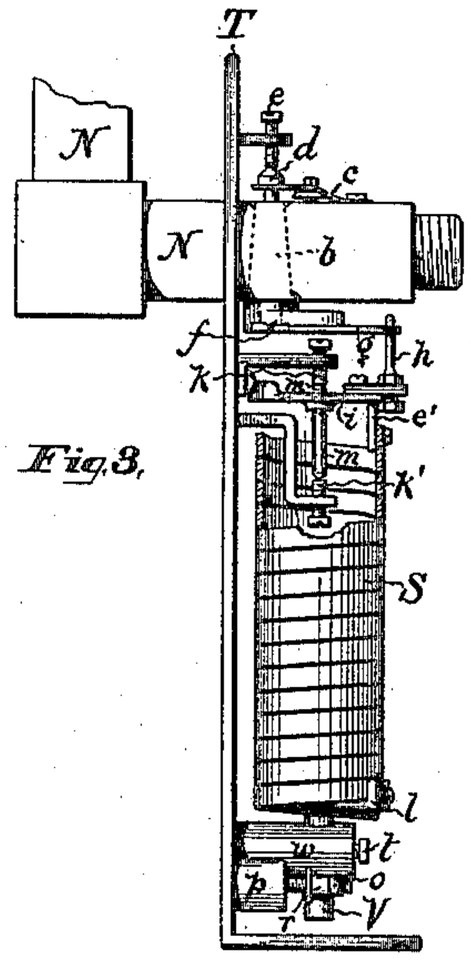

Fig. 4.

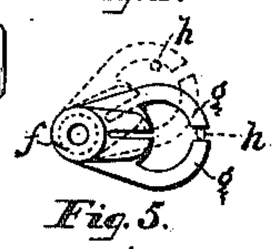

Fig. 5.

Fig. 6.

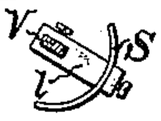

Fig. 7.

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EDWARD J. FROST, OF PHILADELPHIA, PENNSYLVANIA.

TEMPERATURE-REGULATOR FOR CARBURETORS.

SPECIFICATION forming part of Letters Patent No. 363,324, dated May 17, 1887.

Application filed July 1, 1886. Serial No. 206,787. (No model.)

To all whom it may concern:

Be it known that I, EDWARD J. FROST, of the city of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Devices for Regulating the Temperature of Carburetors.

The following is a specification of my said improvements, reference being had to the accompanying drawings, wherein—

Figure 1 represents a central vertical section through the apparatus. Fig. 2 is a front elevation of the actuating device of the regulator. Fig. 3 is a side view of said actuating device; and Figs. 4, 5, 6, and 7 are views of the details thereof, said six last-mentioned figures being on an enlarged scale.

In the practical operation of carburetors it is found that variations of temperature will greatly affect the degree of saturation, and consequently the illuminating-power of the vapor, the evaporation being of course less in cold weather, and vice versa.

The object of my improvements is to provide a means for automatically maintaining the temperature of the carburetor and its contents at a substantially fixed point, so that a uniform product will be obtained notwithstanding any variation of external temperature.

In the accompanying drawings I have shown the regulating devices applied to such a carburetor as is patented in my Letters Patent No. 278,529, dated May 29, 1883; but it must be understood that they are applicable to any other form of carburetor.

In the said drawings, A represents the carburetor conducted as above mentioned, with a spiral air-passage having strands of cotton wicking B disposed through it, an inlet-pipe, E, for air-supply from any suitable blast apparatus, an inlet-pipe, H, for gasoline or volatile hydrocarbon, an outlet-pipe, I, for drawing off the excess of hydrocarbon, and an outlet-pipe, F, for conducting away the carbureted vapor to the burners.

I surround the carburetor-chamber with a closed shell, C, mounted upon suitable supports, R, and of such size as to leave an open space, *a*, all around the carburetor within the shell. A chimney, D, leads from the top of the apparatus, and at the bottom a chimney, J, on an ordinary burner, B′, communicates with the open space *a*. This burner B′ is supplied in the following manner: From the exit-pipe F a branch, L, extends downward beneath the shell C, where it communicates with a chamber, K, surrounding the upper part of the chimney J. Said chamber has a spiral passage-way similar to that of the carburetor, and also contains cotton wicking, the object being to take up any of the liquid that may drip down through the pipe L, and by distributing the same prevent the spluttering or jumping of the flame. I do not, however, in this application claim said spiral chamber arranged in the manner described, but merely mention it as a convenient adjunct to the apparatus. From the other end of the said spiral passage a pipe, L′, leads to the burner B′.

Near the upper end of the pipe L is an ordinary stop-cock, *a′*, and a branch pipe, N, leads from the pipe L at a point on that side of the stop-cock *a′* which is nearest to the main exit-pipe F to a point, O, which is between the stop-cock and the burner B′. Said pipe N thus forms a secondary passage or branch around said stop-cock.

The passage-way through the branch N is controlled by a valve which is operated by a thermostat. (Indicated in Fig. 1 by P, and shown on an enlarged scale in the remaining figures.) Referring now to this, it will be seen that the pipe N is controlled by the valve *b*. (Shown in the dotted lines in Fig. 3.) Said valve *b* turns upon a vertical stem, *d*, which is suspended at top upon a spring, *c*, its height being regulated by a set-screw, *e*. At the lower end of the stem, and beneath the pipe N, is attached a horizontal piece, *f*, having curved arms *g*, which converge together, as shown in the plan view of Fig. 4, but have a small opening between them. Within this opening a vertical pin, *h*, fits, said pin being mounted upon one end of a horizontal pivoted plate, *i*. (Shown in plan view in Fig. 5.) The pivot *m* of said plate *i* is supported between the set-screws *k* and *k′*, so that it can be adjusted to turn with any desired ease. A downwardly-depending stud, *e′*, of the plate *i* is secured to the upper end of a thermostatic device, which may consist of a composite spiral strip, S, formed of two kinds of metal and attached at its bottom by means of a radial

arm, *l*, to a vertical post, V. This post passes through a hole in the bracket *w*, where it is secured by means of a set-screw, *t*. The post V turns freely in said hole, and may be adjusted by rotation therein in the following manner: A laterally-projecting arm, *o*, is attached to the post V near its lower end, and said arm is provided with a slot which engages with a flange upon the screw *r*, mounted in the end of a bracket, *p*, as shown in Fig. 7. By turning said screw *r* in one direction or the other the arm O will be thrown toward or from the bracket, and thus the post V will be rotated upon its axis, so as to wind or unwind the spiral S and produce any desired degree of tension therein.

The lower end of the spiral S being rigidly attached, any change of temperature will of course occasion a movement of the upper or free end thereof in one direction or the other, and the movement of the upper end of the spiral S will, by means of the stud *e'*, cause the plate *i* to turn upon its pivot, and thus throw the vertical pin *h* in one direction or the other.

By reference to Figs. 4 and 5 it will be seen that the radius of rotation of the pin *h* is much shorter than the radius of rotation of the arms *g*. Consequently, when said pin is moved by the rotation of the plate *i*, it will for a short distance turn the arms *g* with it; but it will soon slip out of the slot and pass into the open space between them, as indicated by the dotted lines of Fig. 4. On returning, the pin will again re-enter the slot between the arms and resume its position. Thus, although the range of rotation of the pin *h* is considerable, it can only move the arms *g* to a limited extent in either direction.

The movement of the arms *g* and plate *f* will of course open or close the valve *b* and the pipe N.

Turning now to Fig. 1, it will be seen that the frame T, on which the thermostat is supported, is within the open space *a*, and as this space *a* forms a passage-way for the products of combustion from the burner B' to the chimney D any change of temperature in said passage-way will affect the thermostat. Furthermore, the movement of the thermostat, in consequence of said change, will open or close the valve *b*, and thus increase or diminish the flow of vapor through the branch N. Assuming now that the stop-cock *a'* is set so that it will just supply the burner B' with enough vapor to produce a faint flame, and that the products of combustion from said flame ascending through the open space *a* will warm the carburetor under normal conditions to just the proper degree, and assuming that the thermostat is set so that with this normal temperature it will maintain the valve *b* closed, then, if the temperature in the open space falls, the movement of the thermostat will turn the arms *g* and plate *f*, so as to open the valve *b* and permit the flow of vapor through the branch N around the stop-cock *a'*. The flame of the burner B' will be thus increased, and the temperature in the open space *a* will rise until the normal is reached, when the thermostat will return to its former position, and wholly or partially close the valve *b*.

The adjusting devices of the thermostat enable me to set it at any desired point, and thus to regulate with extreme nicety the movements of the valve *b*, so that a very minute control of the temperature in the open space *a* (and consequently within the carburetor) can be maintained.

Having thus described my invention, I claim—

1. The combination, with a carburetor, of the following elements, arranged and operating substantially as described, viz: an inclosing-shell surrounding said carburetor in such manner as to leave an open passage around the same, a lamp arranged beneath said shell, openings at bottom and top of said shell to permit the entrance and exit of products of combustion or hot air from the lamp, a normal feed for said lamp, a secondary supply-pipe leading from the carburetor to the lamp, a valve in said secondary supply-pipe, and a thermostat arranged in the open passage around the carburetor and controlling said valve.

2. The combination of the pivoted valve *b*, connected with the arms *g g*, and the pin *h*, connected with the thermostat and mounted upon a pivoted plate, the radius of rotation of said pin being less than that of the arms, whereby the pin will actuate the valve during only a portion of its movement by the thermostat, substantially as set forth.

EDWARD J. FROST.

Witnesses:
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E. MEYER.