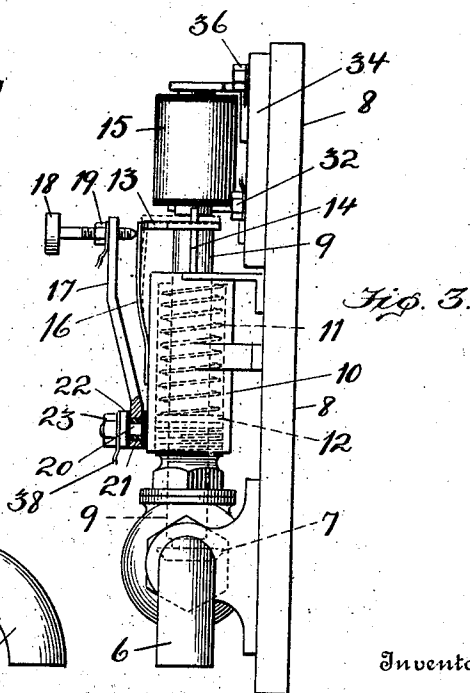
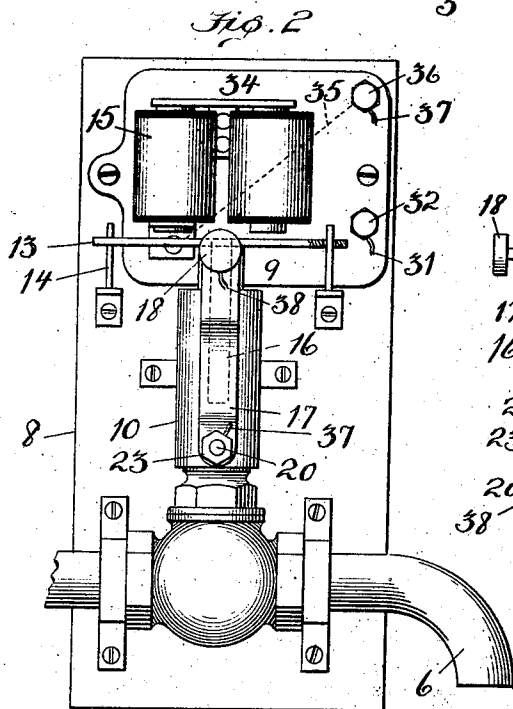
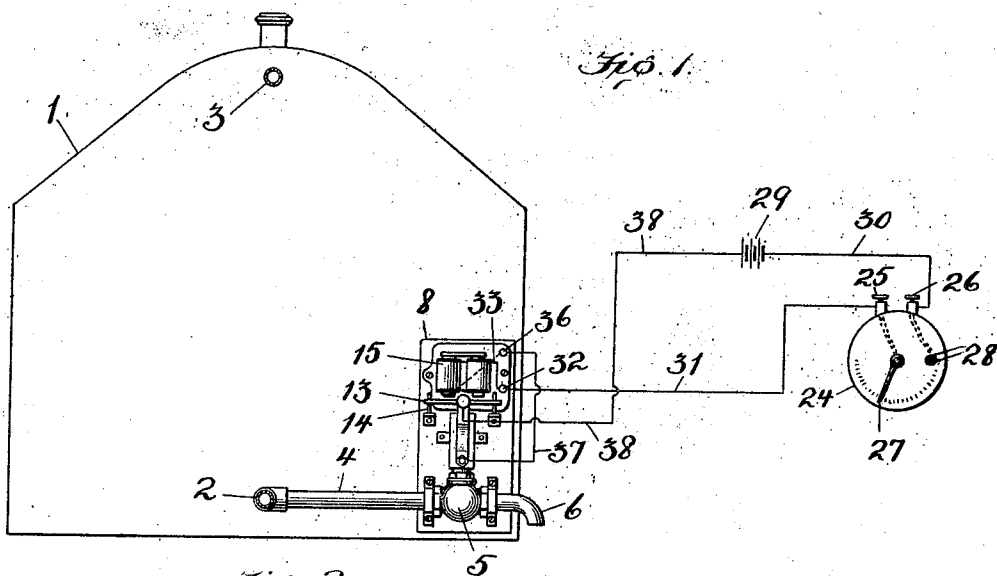


H. S. CAMPBELL.
 MEANS FOR PREVENTING THE FREEZING OF WATER IN THE CIRCULATING SYSTEMS OF
 AUTOMOBILE ENGINES.
 APPLICATION FILED FEB. 21, 1911.
 1,028,808. Patented June 4, 1912.



Witnesses
 Edwin L. Bradford
 & Ferd. Vogt

384

Inventor
 Howard S. Campbell
 Mann & Co.
 Attorneys

UNITED STATES PATENT OFFICE.

HOWARD S. CAMPBELL, OF BALTIMORE, MARYLAND, ASSIGNOR OF ONE-THIRD TO JACOB ZILL AND ONE-THIRD TO PERCY TEIXEIRA DE MATTOS, BOTH OF BALTIMORE, MARYLAND.

MEANS FOR PREVENTING THE FREEZING OF WATER IN THE CIRCULATING SYSTEMS OF AUTOMOBILE-ENGINES.

1,028,808

Specification of Letters Patent.

Patented June 4, 1912.

Application filed February 21, 1911. Serial No. 610,019.

To all whom it may concern:

Be it known that I, HOWARD S. CAMPBELL, a citizen of the United States, residing at Baltimore, in the State of Maryland, have
5 invented certain new and useful Improvements in Means for Preventing the Freezing of Water in the Circulating Systems of Automobile-Engines, of which the following is a specification.

10 This invention relates to means for preventing the freezing of water in the radiators of automobile engines.

It is well known to persons acquainted with automobiles that considerable trouble
15 and annoyance is occasioned if the water employed in the cooling system of automobile engines freezes. This freezing is most liable to occur when a machine is left standing in the open or is left over night in
20 a cold garage without drawing the water from the circulating system. In most instances the freezing will begin in the tubes or hollow bars of the radiator because only a slight body of water is contained therein
25 and the cold is readily conducted through the thin exposed tubes or bars to the water, with the result that the tubes or bars become ruptured at their joints requiring tedious and expensive repairs to be made.

30 The present invention therefore has for one of its objects to provide a device which will automatically drain the radiator of water in case the temperature falls sufficiently to cause the water to freeze.

35 The accompanying drawing illustrates one form of mechanism for carrying out the invention wherein,

Figure 1, shows a diagrammatic illustration of an automobile radiator to which the
40 improvement is attached and also shows a thermostat or similar temperature register with an electric circuit wiring. Fig. 2, is an enlarged side elevation of the device, and Fig. 3, an edge or front elevation of the
45 same.

In the drawing, 1, designates an automobile radiator which may be of any suitable construction and which is interposed in the

water circulating system of an automobile engine,—the latter however not being shown 50 for the reason that it is deemed unnecessary. The radiator is provided with suitable tube connections, 2, and, 3, for the circulation of water between it and the engine.

The connection, 2, at the lower end of the radiator is provided with a branch pipe, 4, 55 leading to a valve casing, 5, which latter has a discharge outlet or nozzle, 6. Normally the valve, 7, (see broken lines in Fig. 3) is held in the closed position by means 60 of pressure exerted from above in any suitable way so that the water in the tube or pipe, 2, may not escape by way of the valve casing and nozzle.

By reference to Figs. 2 and 3 it will be 65 noted that the valve mechanism is mounted on a base or plate, 8, merely for convenience and in order that the same may be readily secured in place, preferably at the rear side of the radiator casing as shown in 70 Fig. 1.

In the present instance the valve, 7, has a stem, 9, which extends through a cylinder, 10, and a spring, 11, is coiled about the stem and between the latter and the cylinder so 75 as to exert a downward pressure on a pin, 12, that extends crosswise through the stem,—the upper end of the spring abutting against the upper end of the cylinder, all as shown by broken lines in Fig. 3 of the 80 drawing. The valve stem, 9, carries a plate, 13, at its upper end which extends horizontally in the present instance, and serves as an armature as will presently be explained. The opposite ends of the said 85 armature plate, 13, is provided with perforations through which vertical guide pins, 14, extend so as to prevent the stem, 9, from turning in the cylinder and valve casing.

Suitable electro-magnets, 15, are carried 90 on the plate, 8, over the armature plate, 13, and the position of these magnets with respect to the plate is such that when they are energized by the formation of an electric circuit therethrough they will attract 95 the armature plate, 13, and draw the stem,

9, and valve, 1, up so as to uncover a port that will permit the water to flow from the circulating system out through the nozzle, 6.

At one side the cylinder, 10, carries a spring finger, 16, the latter being secured at its lower end to the cylinder and having its upper end projecting above the cylinder and pressing against the outer edge of the armature plate, 13, while the latter is down and while the valve, 7, is seated. An arm, 17, is also carried by the cylinder or by any other preferred portion of the structure but insulated from the latter so that an adjustable contact screw, 18, may be passed through the upper end of the arm and normally maintained in contact with the upper end of the spring finger, 16, as shown in Fig. 3. A binding nut, 19, is provided on the screw, 18, at the outer side of the arm, 17. In the present instance the arm, 17, is held in place at its lower end, a pin, 20, being secured in the wall of the cylinder and having a bushing, 21, of insulating material around the same to insulate the arm from the pin and also from the cylinder. Insulating washers, 22, are also provided at opposite sides of the said arm, 17, and a binding nut, 23, is screwed onto the outer end of the stem for a purpose presently to be explained.

In the normal running condition the devices above described are as shown in the drawing,—the magnets being deenergized and the armature plate and valve stem remaining in the lowered position.

To effect an operation I make use of a thermostat or temperature indicator, 24, which is shown diagrammatically in Fig. 1 but which in practice will be attached adjacent to the radiator wall so as to be affected by the temperature adjacent that wall. This indicator may be of any suitable construction but is provided with suitable binding posts, 25, and, 26, respectively; a movable indicator arm, 27, and a contact point, 28, which latter may be rigid or movable as desired. Suitable electrical connections are provided between the binding post 25, and the arm, 27, while another electrical connection is provided between the post, 26, and the contact, 28.

A battery, 29, provides a suitable current for energizing the electro-magnets, 15, and one side of said battery is connected by a wire, 30, with the binding post, 26, of the temperature indicator while the other binding post, 25, is connected by a wire, 31, with a binding post, 32, on the base plate, 8, and from the latter by wire, 33, or through the plate, 34, to the electro-magnets, 15. A wire, 35, extends from the electro-magnets to another binding post, 36, on the plate, 34, and another wire, 37, extends from this latter post, 36, to the binding nut, 23, that is carried on the stem, 20, and which enters the

wall of the cylinder, 10. The circuit is then continued through the spring finger, 16, to contact screw, 18, and then by wire, 38, to the other side of the battery, 29.

The operation of the device is as follows:—When the temperature at the indicator, 24, which as hereinbefore explained is preferably located at the inner side of the radiator, has fallen sufficiently to cause the indicator arm, 27, to move against the contact point, 28, the circuit will immediately be established from the battery, 29, through the electro-magnets, 15,—the circuit being formed by wire, 30; post, 26; contact, 28, arm, 27; post, 25; wire, 31, to post, 32, then by wire, 33, or the plate, 34, to magnets, 15, and thereby energize the latter, raise armature plate, 13, valve-stem, 9, and valve, 7, thereby opening the outlet from the system and permit the water to drain off through the nozzle, 6. From the electro-magnets, 15, the circuit is completed through wire, 35, to post, 36, and by wire 37, to stem, 20, then by the cylinder wall, 10, to spring finger, 16, and contact screw, 18, and finally from said contact screw by wire, 38, to other side of battery, 29. It will be noted by reference to the broken lines in Fig. 3, that when the armature plate, 13, has been attracted by the magnets and thereby elevated, that the upper end of the spring finger, 16, will snap beneath said armature plate and form a support at the bottom side thereof thus preventing the plate from dropping and thereby locking the stem and valve in the raised position to keep the valve port open to the nozzle, 6. It will also be noted that when the spring finger, 16, snaps beneath the armature plate, 13, the contact between its upper end and the inner end of the contact screw, 18, will become broken thus breaking the circuit between the two poles of the battery and cutting off the current. By this means the battery may be cut out after it has performed its work and its life thereby prolonged. It will thus be seen that when the temperature adjacent the circulating system becomes sufficiently low to be apt to freeze the water that the indicator will cause a circuit to be established to energize the magnets and thereby vent the system so the water therein may run off.

Having thus described my invention what I claim and desire to secure by Letters Patent is,—

1. The combination with a radiator of an automobile, of a drain pipe from the radiator; a vent device in said drain pipe; electrical means for actuating the vent device and mechanical means for holding said vent device in the actuated position.

2. The combination with the radiator of an automobile, of a drain pipe from the lower end of the radiator; a valve in said pipe and having a stem; an armature car-

ried by the stem; an electro-magnet adjacent the said armature; a temperature-actuated element; an electric circuit including the temperature-actuated element and the electro-magnet, and means for engaging the armature to hold the latter after the electro-magnet has moved the same.

In testimony whereof I affix my signature in presence of two witnesses.

HOWARD S. CAMPBELL.

Witnesses:

G. FERD. VOGT,
CHAS. B. MANN.