G. W. DONNING.

CARBURETER.

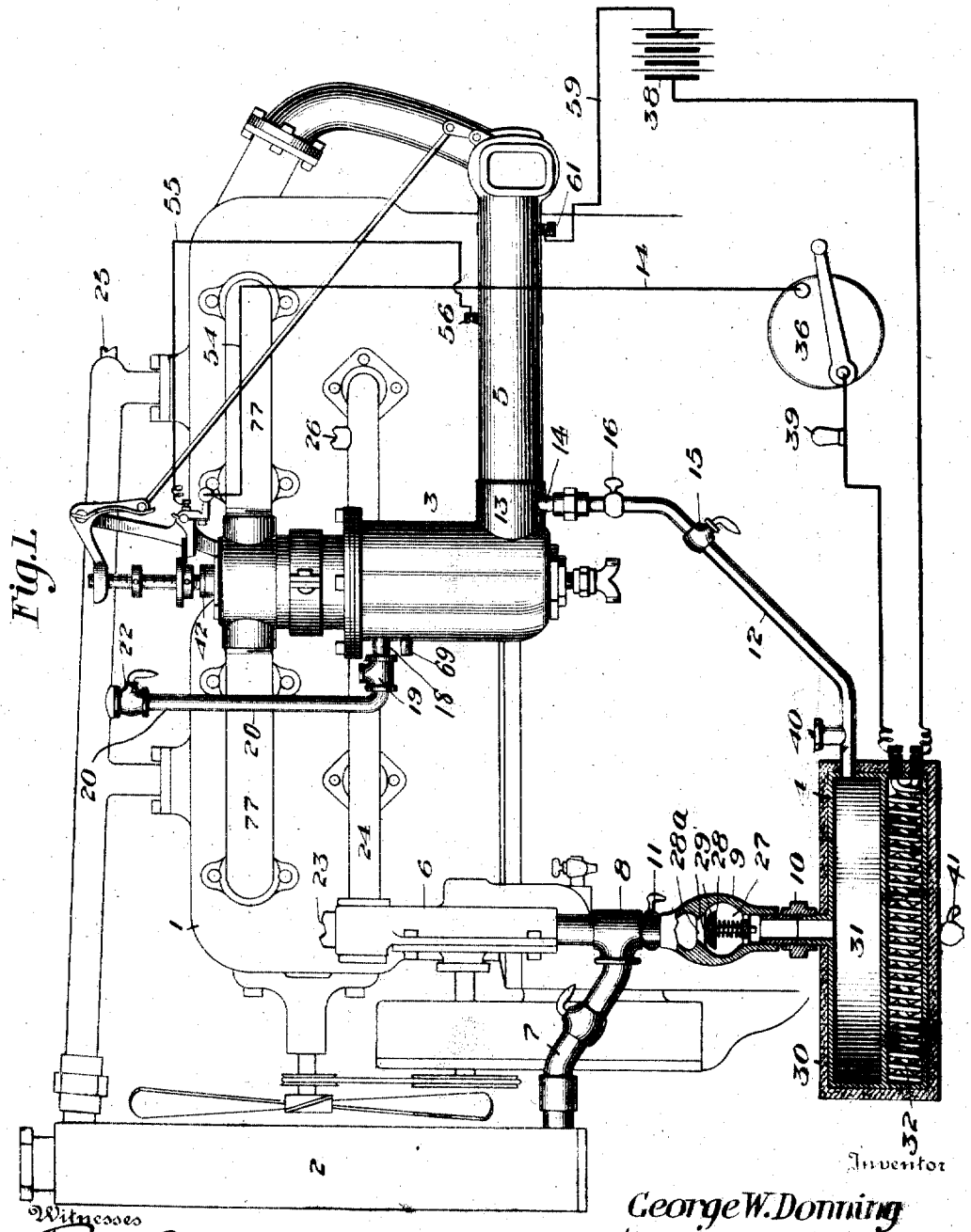
APPLICATION FILED AUG. 26, 1915.

1,246,727.

Patented Nov. 13, 1917.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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4 SHEETS—SHEET 2.

Fig. 2.

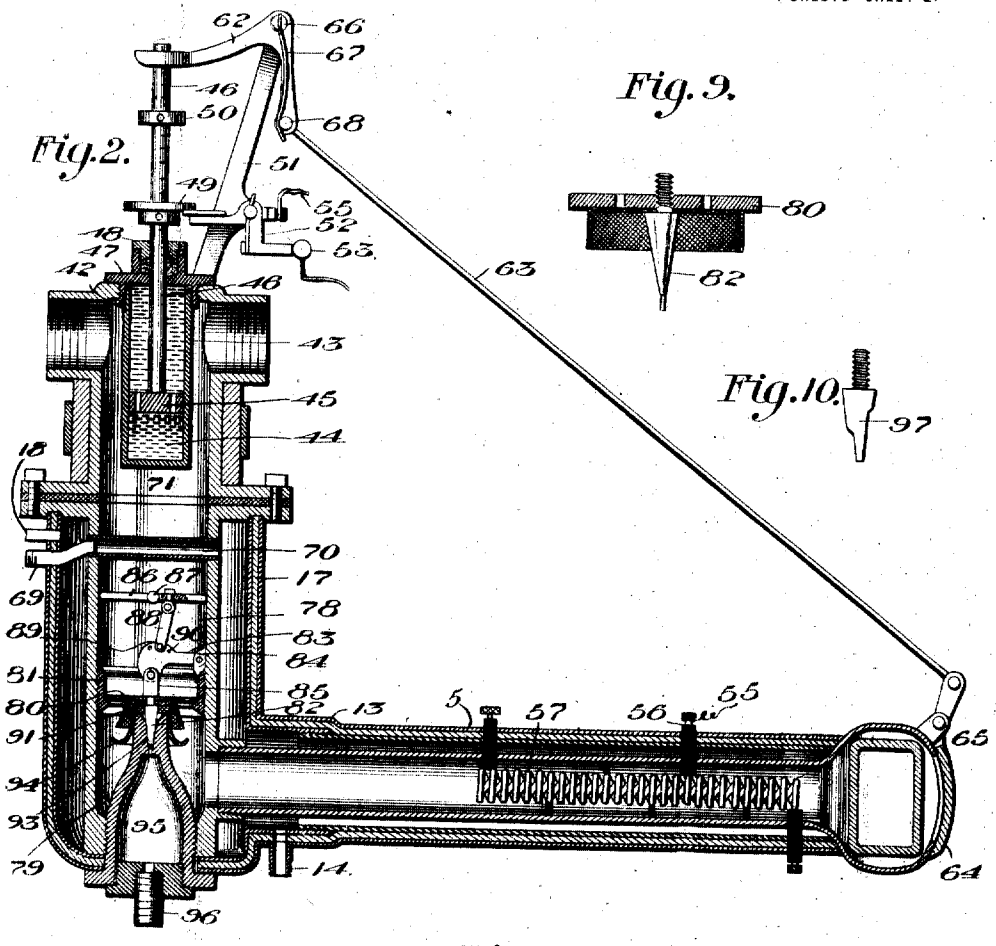
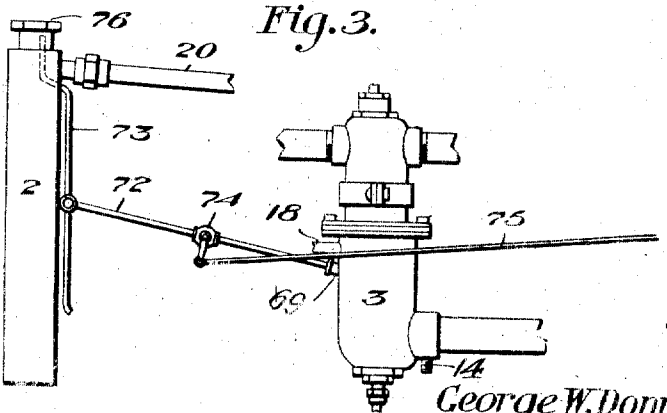


Fig. 9.

Fig. 10.

Fig. 3.



Witnesses

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4 SHEETS—SHEET 3.

Fig. 4.

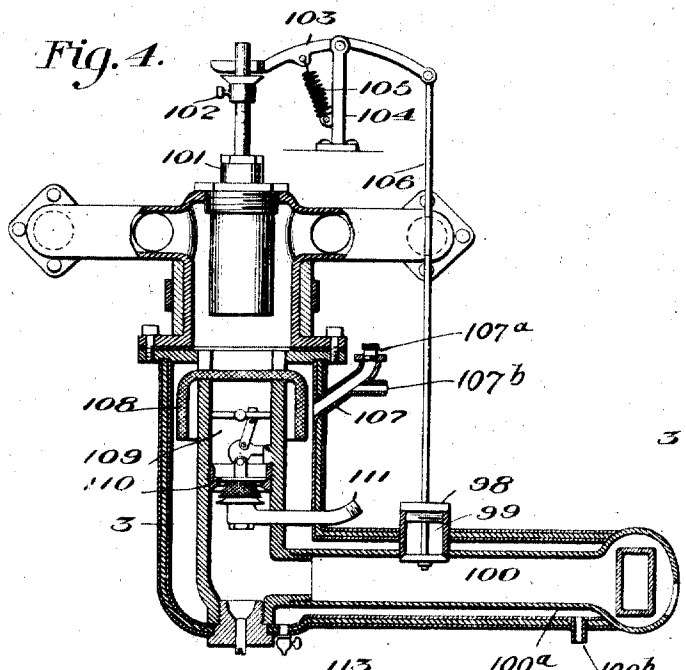


Fig. 7.

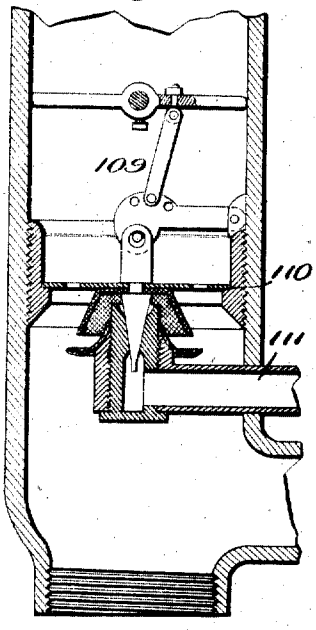


Fig. 5.

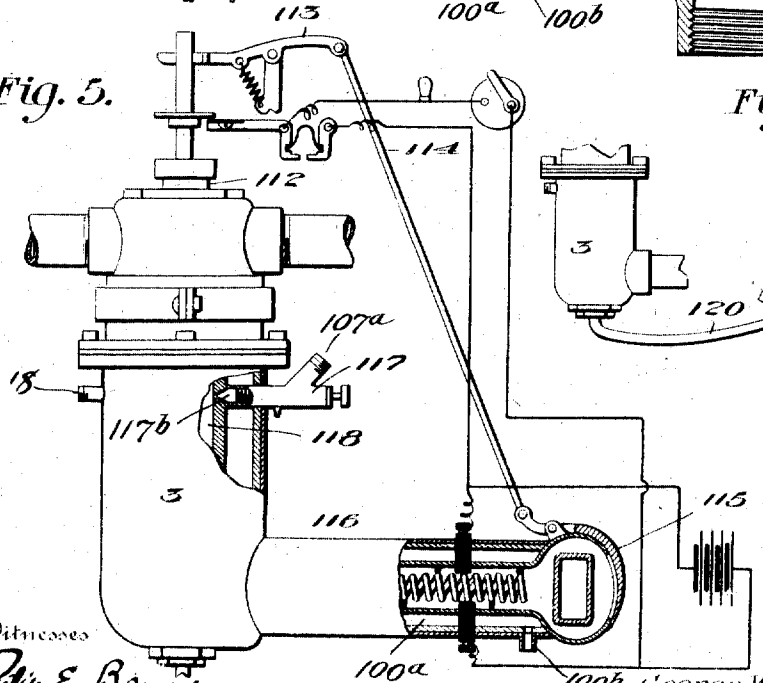


Fig. 8.

Witnesses

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APPLICATION FILED AUG. 26, 1915.

1,246,727. Patented Nov. 13, 1917.

4 SHEETS—SHEET 4.

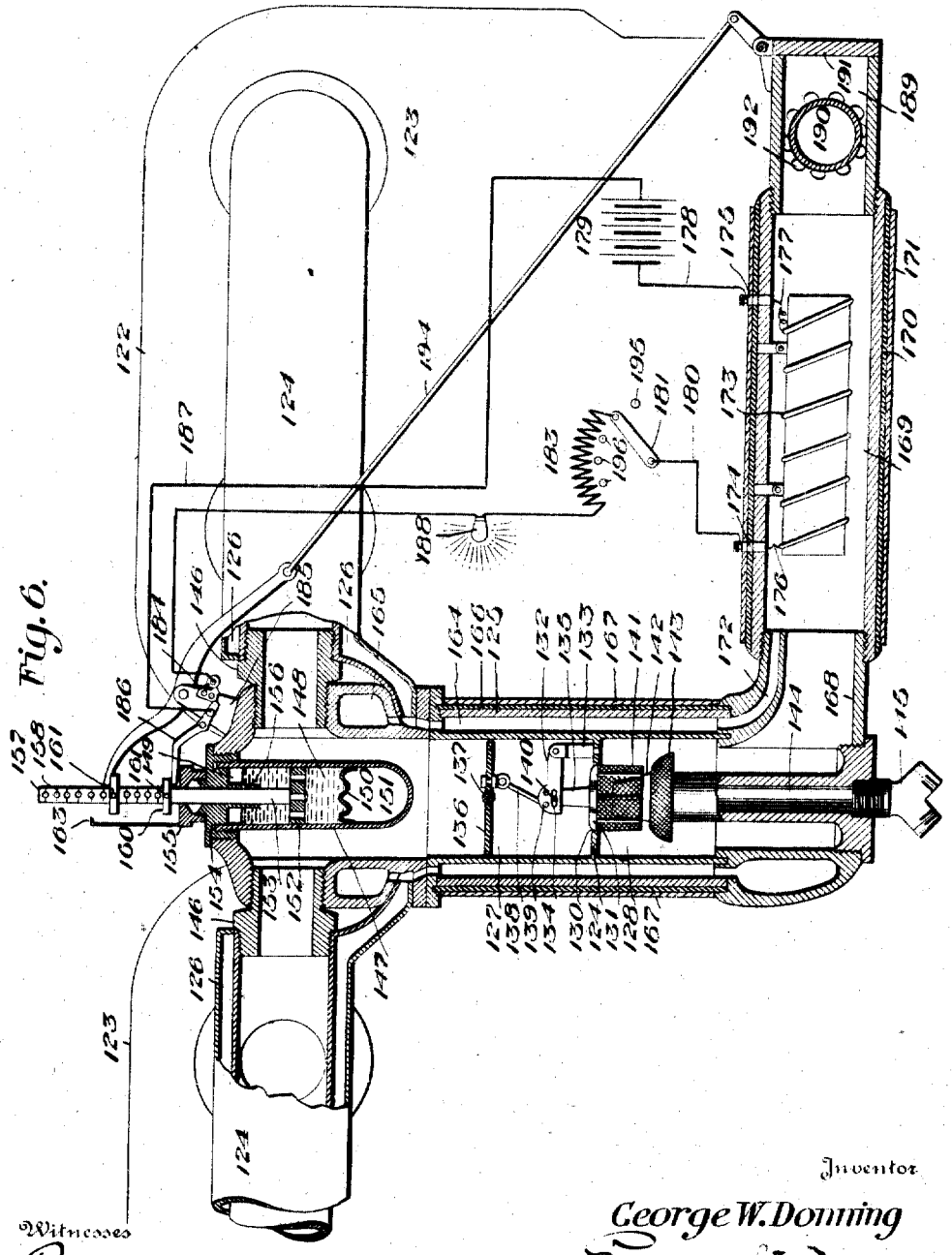


Fig. 6.

Witnesses

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UNITED STATES PATENT OFFICE.

GEORGE W. DONNING, OF STAMFORD, CONNECTICUT.

CARBURETER.

1,246,727. Specification of Letters Patent. Patented Nov. 13, 1917.

Application filed August 26, 1915. Serial No. 47,530.

To all whom it may concern:

Be it known that I, GEORGE W. DONNING, a citizen of the United States, residing at Stamford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Carbureters, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates broadly to the generation of heat, and more especially to devices for generating heat for warming water-cooled or air-cooled motors and, also, for facilitating the production of gas for the motor.

The object of the invention in its broadest aspect, and particularly with reference to water-cooled motors, is to effect the prevention of chilling and freezing of water within the radiator, motor and carbureter jackets; and, with reference to air-cooled motors, is to effect the heating of the air within the conductors or air-channels, for a like purpose.

A further object of the invention is to provide means for automatically initiating the production of heat whenever and wherever the temperature of the radiator, carbureter, and motor drops below a selected degree of temperature predetermined by the operator.

Another object is to utilize electrical instrumentalities, for example an electric heater or a series of electric heaters, provided with signals or indicators whereby their operation is instantly made apparent.

Another object is to utilize a thermostatically operated valve to control the temperature of the air which is to be introduced into the carbureter, and to govern its flow when the motor is idling or standing still.

Still another object within the contemplation of the invention is to provide means for varying the time of operation of the automatic device—for example, when the motor is idle so as to maintain a low heat and immediately in advance of using the motor—in order that a higher temperature may result to produce practically the maximum of efficiency in the motor and carbureter at the start.

The invention in general seeks to provide means for use, particularly, on motors employed in automobiles, the proposed device, from an operative standpoint, possessing a high degree of efficiency and being capable of ready and fine adjustment.

Other objects and advantages will be obvious from the annexed drawings, while others will be made apparent in the following description.

The invention resides broadly in the features of construction and in the aggroupment of elements and instrumentalities, all as exemplified in the construction hereinafter set forth, and the scope of application of which will be indicated in the claims hereto appended.

That the invention may be comprehend by those skilled in the art, drawings illustrating some of the many possible embodiments and utilizations of the same are hereto appended as a part of this disclosure; it being manifest that other possible embodiments and utilizations (employing the underlying principles of the invention) fall within the spirit thereof and within the objects contemplated thereby.

In the drawings:

Figure 1 is a view in elevation, partly in section, showing a motor, its cooling system, a carbureter, and a heat-generating device constituting one embodiment of my invention;

Fig. 2 is a view in vertical longitudinal section, showing the carbureter illustrated in Fig. 1, heat-producing instrumentalities therein, etc.;

Fig. 3 is a fragmentary view, in elevation, showing mechanism for supplying the gas-chamber of the carbureter with additional quantities of air;

Fig. 4 is a view in vertical longitudinal section of a modified form of carbureter;

Fig. 5 is a fragmentary view, in elevation, partly in section, of another modified form of structure and showing, particularly, how the main fuel-supply may be utilized for priming the carbureter;

Fig. 6 is a fragmentary view, partly in sectional elevation, showing another modified form of structure.

Fig. 7 is a fragmentary view in vertical section showing, on a larger scale, certain details of a valve-device in the carbureter construction of the form illustrated in Fig. 4;

Fig. 8 is also a fragmentary view, partly in elevation and partly in section, showing

an auxiliary fuel-tank and means for regulating the flow of fuel therethrough; and

Figs. 9 and 10 are detached views of certain other details of the carbureter construction.

Referring to the drawings, and particularly to the embodiment illustrated in Fig. 1, the reference-character 1 designates, generally, a motor which may be of the air-cooled or water-cooled form; 2 designates a radiator; 3 designates, generally, a carbureter of improved construction; 4 designates a primary heat-generating box; 5 designates a secondary heating box; and 6 designates a pump for moving air or water (as the case may be) through the cooling system of the motor, etc. Leading from the motor 1 is an exhaust-manifold 1^a which passes through one end of the secondary heating-box 5.

Leading from the radiator 2 is a fluid-conductor in the form of a pipe 7, and this is connected to a main fluid-conduit 8 which, in turn, is connected to the primary heat-generating box 4 and also with the pump 6. Preferably and as shown, the conduit 8 includes a valve-casing 9, a coupling or union 10, and a cut-off device 11.

Leading from another portion of the primary heating box 4 is a conduit 12 which connects with an extension 13 of the carbureter 3, the latter being provided with a nipple 14 (Figs. 1 and 2). The conduit 12 is provided with a controlling cock 15 and also with a draw-off 16 (Fig. 1).

The carbureter includes a jacket 17 which, in this instance, encompasses the lower portion of the carbureter. At the upper end of the jacket a nipple 18 is provided and on this is mounted a cap coupling 19 which provides means for introducing a fluid into the jacket, as will presently be described. Extending from the coupling 19 to a circulation-return conduit 20—which, as shown, connects with the radiator 2 at one end and with the different cylinders of the motor—is a pipe 21 which, adjacent to its connection with said return-conduit, is provided with a controlling cock 22.

Leading from the pump 6 is the usual direct conduit 23, here shown as broken off, of the water-cooling system.

To provide for effective circulation of the cooling fluid around the lower portions of the cylinders, a conduit 24 is shown as extending from the pump 6 and coupled into the jackets of the motor-cylinders, as usual. If desired, the direct conduit 23 may be omitted and the conduit 24 employed by itself, since it is obvious that it may also perform the function of the conduit 23 when the pump is in operation. As shown, the conduits 20 and 24 may be connected, as by pipes 25 and 26 (shown in Fig. 1 as broken off) with foot-warming devices (not shown).

Housed within the casing 9 is a spring-controlled valve 27 which, normally, is maintained away from its seat 28^a. In order to permit or by-pass a limited quantity of fluid through the conduit 8, while the valve is seated, as by suction, the valve-head 28 is provided with restricted apertures 29. Of course, any irregularity in the contacting surfaces of the valve-head and its seat would permit similar by-passing of the fluid.

Preferably and as shown in Fig. 1, the primary heating box 4 is protected by an envelop 30 of non-conducting material. Similarly the carbureter and the conduits aforementioned may be protected.

Disposed within the fluid-containing chamber 31 of the heating box 4 is an electric heating element or coil 32 provided with terminals 33 and 34. A conducting wire 35 connects the heating box with a switch 36, while a conducting wire 37 connects with a battery 38. On the wire 35 is a light 39.

If it be necessary to draw off or fill the heating box with water, this may be accomplished through the filling-nozzle 40 mounted on the conduit 12. To withdraw water from the heating box, a draw-off cock 41 is provided, which extends into the chamber 31. In an emergency, for instance—due to accident or ineffectual operation of other parts—it may be desirable to withdraw the cold water from the jacket surrounding the carbureter and to fill the same with a hot liquid. To this end, the cocks 15 and 22 are utilized and, also, the filling-coupling 19 and the draw-off 16. So, also, if the temperature of the fluid is too high for effective operation of the carbureter the cocks 15 and 22 may be closed.

In order to cause, automatically, the operation of the temperature-controlling instrumentalities of the structure, I may provide any suitable means, and these are disposed within the effective zone of the heating fluid. In the embodiment illustrated in Figs. 1 and 2, for example, the controlling means utilized is illustrated as a thermostatic device designated, generally, by the reference-character 42. This includes a fluid-holder 43 adapted to contain an actuating fluid 44 which operates upon a head 45 carried by a stem 46 which has an up-and-down movement in the cap 47 screwed on to the holder 43 and which is provided with a stuffing-nut 48. The stem 46 is graduated in degrees of temperature, as shown, and carries a collar 49 which is adjustable on the stem 46. The stem also carries a second collar 50 similarly adjustable thereon, and which has a function presently to be explained. Upstanding from the carbureter is a bracket 51 and on this is pivoted a small bell-crank-lever 52, one arm of which is arranged in the path of move-

ment of the collar 49, while the other arm has a contacting engagement with a terminal 53 with which a conducting wire 54 is connected and which wire at its other end connects with the switch 36. A second conducting wire 55 is connected to the bracket 51 at one end and has its opposite end extending to a terminal 56 attached to a heating element or coil 57 in the auxiliary heating box 5. Also connected to the heating element 57 is a second terminal 58 and to this is connected a lead wire 59 which extends to the battery 38.

Preferably and as shown, the auxiliary heating box 5 is directly connected to the carbureter 3 and all air introduced into the carbureter passes through this heating box; but it is to be understood that it may be differently located if desired. In addition to the terminals 56 and 58 on this heating box 5, I may also provide auxiliary terminals 60 and 61. The purpose of having a plurality of sets of terminals is in order that a long or a short section of heating element may be inserted within the heating box, as conditions may require. Preferably, when the auxiliary heating box is utilized, it is maintained in the same circuit as the heating element 32 in the primary heating box 4.

Pivoted adjacent the upper end of the bracket 51 is a bell-crank-lever 62, one arm of which embraces the upper end of the stem 46 and is adapted to engage the collar 50. To the other arm of the lever is connected an actuating rod 63 which, at its opposite end, is connected to a controlling member 64 pivoted to the end of the auxiliary heating box 5 and adapted to close an opening 65 therein. On the axis 66 of the bell-crank-lever 62 is secured a band spring 67 which abuts against a lug 68 on the lower end of the lever 62. This spring has as its function to maintain the lever 62 in normal position.

Preferably and as shown in Fig. 2, the carbureter jacket is provided with a nipple 69 which connects with a pipe section 70 disposed within the carbureter and which has its upper surface perforated as at 71. The nipple serves to permit the introduction of air into the section 70 and this feeds such air into the interior of the carbureter. In other words, while the motor is drawing up gas, a certain amount of the air from the section 70 will be drawn into the carbureter. In Fig. 3, there is shown an auxiliary air device which may or may not be attached to the structure already described. This includes a pipe 72 which, at one end, extends into the nipple 69 and, at the other end, connects with a vertical pipe 73 which normally is open to the atmosphere at one end and, at its other end, extends into the cap 76 of the radiator 2. The pipe 72 is provided with a valve 74 that may be actuated by a rod 75 arranged so that it may conveniently be operated by the driver of the car. When the rod 75 is operated to open the valve 74 moisture may be drawn from the radiator, and air may be drawn in from the atmosphere through the lower portion of the pipe 73. In the one instance, it is believed that the moisture, added to the gaseous mixture produced in the carbureter, provides a superior mixture; while, in the other instance, the gaseous mixture may be made "lean", at certain speeds of the motor. In both instances, there is effected a saving of fuel.

Into each cylinder of the motor 1 leads a gas manifold 77 which communicates with the carbureter 3.

The carbureter, itself, includes a mixing chamber 78 and an air-chamber 79, these chambers being spaced by a perforated valve-plate 80 seatable on a valve-support 81, sustained by the wall of the carbureter and connected to a conical valve 82. The valve is sustained by an arm 83 pivoted in a lug 84 on the wall of the chamber 78. Pivoted on the arm 83 is a pendant valve-stem 85. Actuation of the valve is effected by a throttle-valve 86 pivoted at 87 and connecting by means (not shown) to an operating lever (also not shown) by which it may be manipulated by the driver of the car. The connection between the valve 86 and the arm 83 includes a link 88 which at its lower end carries a pin 89 adapted to be inserted in one or another of the holes 90 formed in the enlarged portion of said arm.

Depending from the valve-plate 80 and encircling the conical valve 82 is a mesh collar 91 which is adapted to receive waste fuel.

Disposed in the lower portion of the carbureter and extending into the air-chamber 79 is a bottle-shaped nozzle 92, the upper end of which is provided with an elongated passage 93 having converging walls to receive the conical valve 82. Encircling the upper end of the nozzle is a flaring collar 94. The nozzle 92 is hollow to provide a passage 95 and into this is threaded a coupling member 96 adapted to be connected to any suitable source of fuel-supply. This nozzle provides means for introducing into the carbureter fuel of any required grade.

Operation.—Assuming that the atmospheric temperature be thirty degrees (30°) and that the arm of the switch 36 is off, and that the fluid 44 of the thermostatic device has contracted, the collar 49 having been set at, say, 60°, it will have actuated the bell-crank-lever 52 against the terminal 53, thus closing the circuit. Then, when the driver of the car has operated the switch 36 so as to complete the circuit, the signal-light 39 will be lighted and the heating of the coil 32 will

be effected, if such circuit is in fact complete. Assuming, now, that the temperature in the heating-box and thermostatic device 42 has risen to, approximately, 90°, and that the collar 49 has been disengaged from the lever 52, the latter, under the action of its spring, is disengaged from the terminal 53, breaking the circuit and deënergizing the heating-coil 32. In the meantime, the motor may be started. The collar 50, on the stem 46, having been adjusted thereon to, approximately, 90°, and having been raised under the action of the thermostat, it will actuate the lever 62 and thereby effect an opening of the controlling member 64. If the operator then has occasion to stop the motor (the switch 36 being on), the heating-coil 32 will become effective to reheat the contents of the motor and carbureter (which may have become cold), to prevent freezing thereof and to raise the thermostat, etc., again to 90°. This, therefore, automatically controls the temperature within the entire structure.

The heating element 32, or it in conjunction with the heating element 57, having become active, the heating fluid will be warmed and, having attained the proper operating temperature, will have its proper influence upon the thermostatic device 42. The valve 27, being normally open, circulation of the heating fluid would carry the fluid to the pump 6 where it would meet with some resistance. This would cause a more rapid flow of water into the radiator 2 and carbureter 3. The fluid having been warmed, in the manner explained, circulates through all the conduits 7, 12, 21 and 23 or 24. If the operator should wait until the thermostatic device has indicated the selected temperature, the graduated stem 46 will lift the collar 49 away from the bell-crank-lever 52 and permit the same to rock out of contact with the terminal 53, thereby breaking the circuit. The signal light 39, being extinguished, would indicate that the circuit is broken. Instead of a light, an ammeter or other indicator may be employed.

If the motor were started before the desired degree is reached, the suction of the pump 6 will draw the valve 27 against its seat and permit a very slight amount of fluid to by-pass—as through the perforations 29—and this will maintain a slight circulation through the conduits 21, the carbureter 3, and through the conduit 12 to the heating box 4, while most of the fluid will be drawn from another source, as for instance from the radiator 2. Then the motor will assist in warming the fluid whereby the desired results are more quickly accomplished. But the instant that the motor is exposed to a change of temperature so that the temperature of the gas, say, drops below the selected degree, the heaters 4 and 5 will automatically be brought into operation. In this way, the fluid is maintained at substantially a predetermined temperature, either by the heat of the motor-cylinders, by the exhaust therefrom, or by the electric elements within the heating boxes.

Modifications.—In Fig. 10, I have shown a modified form of valve 97, of irregular conformation, adapted to seat in a correspondingly formed passage in the upper end of the nozzle 92.

In Fig. 4, I have shown a modified form of structure, the same differing from that already described in the following particulars: In the first place, the thermostatic device operates a valve 98 which controls a cold air inlet 99 in a heating box 100. To this end, the thermostatic device, indicated generally by the reference-character 101, carries an adjustable collar 102 that is adapted to abut against and rock a lever 103 pivoted on a bracket 104 upstanding from the motor or any other stationary part. A spring 105 serves to hold the lever 103 in normal position. Between the lever 103 and the valve 98 is an actuating rod 106. It will be understood that when the temperature within the carbureter has reached a predetermined degree, the thermostat will permit the lever 103 to rock and thereby lift the valve 98, whereupon cold air may enter the heating box. Another difference is the provision of the filling nozzle 107, carrying a closure-cap 107^a and provided with a pipe-attaching nipple 107^b (Fig. 4); this being of somewhat different form than the filling coupling 19 shown in Fig. 1. The jacket 100^a is provided with a port 100^b. In this instance, also, a fabric element 108 is provided in the upper portion of the carbureter and, by absorbing moisture from the water in the channel, serves to add moisture to the gaseous mixture passing into the mixing chamber 109. The flow of fuel and air into this chamber is controlled by a valve device 110 similar in construction and operation to that already described. The introduction of the fuel, however, in this embodiment is effected through the fuel pipe 111 which enters the carbureter from the side instead of through the bottom.

In Fig. 7, the manner of controlling the flow of the fuel, by the valve device 110, is shown on a larger scale.

In Fig. 5, another modified form of structure is shown: In some respects, this includes the construction illustrated in Fig. 1. In this instance, the thermostatic device 112 operates a lever 113 which in turn controls a rod 114 that actuates a valve 115 mounted on the end of a heating box 116. Moreover, a device 117 (comprising a pipe-attaching nipple 117^a and a needle-valve 117^b) is disposed in the side of the carbureter and permits the introduction, from a suitable source

(not shown) of liquid (such as fuel or water) through the nipple 117ª directly into the mixing chamber 118 whenever it be necessary to introduce a liquid in finely-divided condition thereinto.

In Fig. 8, an auxiliary fuel-tank 119 is shown as connected, through a pipe 120, with the carbureter 3. On the pipe is a fuel-regulating device 121 by which the quantity of fuel flowing to the carbureter from the tank 119 may be regulated to a discernible degree.

In Fig. 6, a still further modified construction is disclosed and one which is arranged particularly for an air-cooled motor, though when slightly modified it is adapted for a water-cooled motor, also. In this instance, the reference-numeral 122 designates, generally, a motor, comprising, in this instance, two motor-casings 123, 123, each of which houses two cylinders (not shown). Into each of the cylinders leads a gas-manifold 124 which communicates with a carbureter-structure 125. The manifolds are each surrounded by a channel 126 adapted to contain a fluid which, in this instance, is air or the like. These channels are supplied with such fluid from a source which will presently be described.

The carbureter 125 includes a mixing-chamber 127 and an air-chamber 128, these chambers being spaced by a partition 129 provided with an opening 130 which is controlled by a valve 131. This valve is sustained by an arm 132 pivoted in the post 133 upstanding from the partition 129. The arm 132 is slotted to receive a pin 134 carried by a pendant valve-stem 135. The slot in the arm 132 permits accurate seating of the valve notwithstanding that the arm 132 moves in an arc when actuated. Such actuation is effected by a throttle-valve 136 pivoted at 137 and connected by means (not shown) to an operating lever (also not shown). The connection between the valve 136 and the arm 132 includes a link 138 which, at its lower end, is bent to present an angular extension 139 adapted to be inserted in one or another of the holes 140 formed in the arm 132.

Depending from the valve 131 is a commingler 141 which, in this instance, is formed of wire mesh. The commingler is adapted to embrace the upper end of a fuel-nozzle 142—controlled by a valve, not shown—upstanding from the lower portion of the carbureter casing, and which is readily removable therefrom. Encircling the nozzle is a mesh collar 143 which is adapted to receive any waste fuel that may be dropped from the commingler 141 or that may overflow the nozzle 142. The nozzle 142 is hollow to provide a passage 144 and into this is threaded a two-membered coupling 145 adapted to be connected to any suitable source of supply of fuel. This provides means for introducing into the carbureter fuel of, say, high specific gravity and, also, fuel of a lower grade, or both, for mixing during their flow through the passage 144. In this way, I provide means for introducing, initially, a sufficient quantity of gasolene, say, to initially warm the motor, after which, heavy fuel, such as kerosene, may be used.

Connecting the manifolds 124 and the upper portion of the mixing chamber 127 are fittings 146 threaded into the carbureter casing and into the ends of the manifolds. These couplings may be of different capacities so that the carbureter can be conveniently connected to motors of any type or horse power.

Mounted in the upper portion of the mixing chamber 127 and in the path of flow of the gaseous mixture from this chamber into the manifolds is a casing 147 adapted to contain a volatile liquid 148, there being an air space 149 left above the liquid, as shown. Disposed in the lower portion of the casing 147, and adapted to support the liquid 148, is a diaphragm 150, beneath which is an air-chamber 151.

Slidably disposed within the casing 147 is a plunger-head 152 carried by a plunger 153 movably supported in a cap-piece 154 threaded over the casing 147 and also into the upper portion of the carbureter casing. A stuffing nut 155 encompasses the plunger 153 and is mounted on the upper end of the cap-piece 154. It is hollow, as shown, for the insertion of packing. The cap-piece 154 is provided with a pendant extension 156 in which the plunger 153 slides, and is of sufficient dimensions to be immersed, always, in the liquid 148, to prevent escape of air from the air-space 149. The upper portion of the plunger is provided with a series of holes 157, opposite to which are temperature-indices 158. Encircling the plunger are two collars 159 and 160, each carrying pins 161 and 162, respectively, adapted to be inserted in one or another of the holes 157 and by which the collars 159 and 160 are maintained in the desired positions on the plunger. Upstanding from the stuffing-nut 155 is an indicator-arm 163 adapted to register with one or another of the indices 158.

It is to be understood that the heat of the gaseous mixture as it passes from the mixing chamber to the manifold effects a heating of the contents of the casing 147 and, by expansion thereof, the plunger is raised. The indicator-arm 163, registering with one or another of the indices, will denote the position of the plunger in the casing and, thus, the temperature of the mixture which is passing into the manifold.

Surrounding the carbureter casing is a channel 164 which communicates with the

channels 126 in the manifolds 124 and also with an enlarged channel 165 surrounding the upper portion of the mixing chamber.

Surrounding the walls of the channel 164 is a covering 166 of asbestos or other suitable non-conducting material. A protecting sleeve 167 surrounds the covering 166.

The lower portion 168 of the carbureter casing extends into an air-heating chamber 169 which, like the carbureter-casing, is covered with a non-conducting material 170 and a protector 171. The portion 168 is provided with an air-channel 172 which communicates with the channels 164 and opens into the chamber 169. Suspended from the upper portion of the chamber 169 is a heating coil 173. Projecting into the chamber are terminals 174 and 175, and between these are wires 176 and 177 connecting with the opposite ends of the heating coil 173. A conductor 178 leads from the terminal 175 to a battery 179, while a conductor 180 from the terminal 174 leads to a handle 181 of a combined switch and rheostat 182.

Leading from the rheostat 182 is a conductor 183 connecting with a terminal 184 carried by a bracket 185 upstanding from the upper portion of the carbureter casing. Pivoted on the bracket 185 is an arm 186 which embraces the collar 160 and is adapted to be actuated thereby. Electrically connected to the arm 186 is a conductor 187 which leads to the battery 179. The arm 186 is adapted to be moved into connection with the terminal 184 and is thereby (when the switch 182 is "on") adapted to complete a circuit through the conductor 187, battery 179, terminal 175, wire 177, coil 173, wire 176, terminal 174, conductor 180, switch 182, and conductor 183. On the conductor or line 183 is a light 188 which is an indicator that current is flowing, and, thus, that the battery 179 is active.

Communicating with the air-heating chamber 169 is an air-heating box 189 through which the exhaust-manifold 190 extends and by which the air in said box may be heated. At the end of the heating-box 189 is a hinge-door 191 adapted, when open, to permit entrance of air, whenever necessary. The heating-box 189 is provided with constantly open ports 192 which, preferably and as shown, are adjacent the exhaust manifold so that the incoming air will be more or less heated therefrom when the motor is in operation. To increase the amount of air passing into the chamber 189, the door 191 is opened and permits cold air to enter the chamber. Automatic means are, in this instance, included, and this means is practically controlled by the position of the plunger 153 which is, itself, controlled in its operation by the temperature of the gaseous mixture passing into the manifold. These means comprise a lever 193 pivoted on the bracket 185 and having one portion normally resting on and actuated by the collar 159, while the other portion is connected by a rod 194 to the door 191.

Operation.—The operation of the structure will be more or less apparent: Assuming that the motor has been at rest, and it be desired to initially heat the air and fuel inlets and the manifold, the handle 181 is moved from the "off" stop 195 to one or another of the rheostat stops 196. At that time, the casing 147 and its contents will, of course, be cold, so that the extension 186 of the arm 185 will be in engagement with the terminal 183. The circuit thus being closed and the lamp 188 burning, the coil 173 will become heated and thereby heat the air in the chamber 169. This heated air will then set into circulation the air in the upper portion of the structure so that, in turn, will be returned to the heating chamber—part, at least—and become heated. The heated air from the chamber 169 having entered the chamber 168 will be trapped therein by reason of the fact that the valve 131 will be closed. Hence, its route will be through the channel 172 into the channel 164 and into the manifold channels 126 and back to the heating chamber 169. This will heat the walls of the mixing chamber and the manifolds 124. In the event that the valve 131 happens to be open, the heated air will pass through the air-chamber 128 into the mixing chamber 127 and heat the walls thereof and, the throttle-valve 136 then being open, this heated air will pass into the manifolds and then into the motor chambers, so that there is, thus, a preheating without and within the manifolds.

The fuel then being permitted to enter the mixing chamber, commingles with the preheated air therein to produce an effective gaseous mixture which passes to the ignition chambers (not shown) in the cylinders and, during its passage thereto, will further heat the casing 147 and its contents, as already described. This will cause the plunger 153 to be raised and, at a predetermined temperature, the arm 186 will be disengaged from the terminal 184, breaking the circuit and thus make the heating coil 173 in the chamber 169 non-effective. In the event that the exhaust-manifold 190, owing to a very low temperature thereof, fails adequately to heat the air entering the chamber 169, whereby the casing 147 and its contents cool down, the plunger 153 will drop and permit the arm 186 to rock, thereby engaging its arm 186 with the terminal 184 to close the circuit again and make the heating coil 173 effective to heat the inflowing air to a predetermined temperature.

Manifestly, a structure of this character

obviates the necessity of providing heat for a garage in cold weather and the introduction of spirits into the circulation system; also the provision of storage batteries of large capacity, of generator such as are now carried by automobiles and yachts. Moreover, by the use of my improved structure, there will be no difficulty in preventing the freezing of the motor or, in fact, the production of gas even when the motor has been in the open atmosphere for a considerable time. Of course, when the automobile is idle, the battery 38 may be disconnected.

My structures are peculiarly adapted to reduce, to a minimum, the possibility of fires. In the event that the carbureter should be fired, it is only necessary to release the throttle control to permit the fuel valve (and the parts controlled thereby) to engage its seat, whereupon the flame would be snuffed out.

From the foregoing, it will be perceived that I have succeeded in devising a carbureter which is well adapted to achieve the several objects and ends in view. The structure is exceedingly simple and compact in form and is particularly well suited for automobiles.

As many changes can be made in the above construction and many other embodiments of the invention can be made without departing from the spirit thereof, it is intended that all matter contained in the foregoing description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What I claim is:

1. A motor heating system including a carbureter-chamber, conduits for a heating fluid, a radiator communicating with said conduits, a fluid-holder disposed without the radiator and in a plane below the radiator and carbureter-chamber, and also communicating with said conduit, a heater within the holder, and means for automatically rendering the heater active and inactive.

2. A motor heating system including a carbureter-chamber, conduits for a heating fluid, a radiator communicating with said conduits, a fluid-holder disposed without the radiator and in a plane below the radiator and carbureter-chamber, and also communicating with said conduit, a heater within the holder, means for automatically rendering the heater active and inactive, and means between the radiator and holder for checking the flow of a fluid therebetween and while the heater is warming the fluid in the holder preparatory to discharging it from the holder.

3. A heating system for motors and the like including a carbureter-chamber, conduits for a heating fluid leading to the chamber, a heater for the fluid, and means for automatically controlling the heater comprising a thermostatic device disposed within and influenced by the temperature of the contents of the carbureter-chamber.

4. A heating system for motors and the like, comprising a carbureting chamber, means adjacent the carbureting chamber and distinct from the motor itself for warming a heating fluid, and conduits for the fluid including a conduit-extension in the carbureting chamber.

5. A heating system for motors and the like, including a chamber, channels in the walls of the chamber, conduits for a heating fluid leading into the channels, an electric heater for the fluid within one of the conduits but without the chamber, a thermostatic device influenced by the contents of the chamber to control the heater and render it active and inactive, and a series of at least three terminals connecting with different portions of the heater to increase the radiating area thereof.

6. A heating system for motors and the like, including an internal combustion engine, a chamber, channels in the walls of the chamber, conduits for a heating fluid leading into the channels, a heater for the fluid within one of the conduits but without the chamber, a thermostatic device influenced by the contents of the chamber to control the heater and render it active and inactive, and an exhaust-manifold associated with the engine and with one of the conduits for heating its contents.

7. A heating system for motors and the like, including an internal combustion engine, a chamber, channels in the walls of the chamber, conduits for a heating fluid leading into the channels, a heater for the fluid within one of the conduits but without the chamber, a thermostatic device influenced by the contents of the chamber to control the heater and render it active and inactive, an exhaust-manifold associated with the engine and with one of the conduits for heating its contents, and a controlling device for said conduit and actuatable by the thermostatic device.

8. A heating system for motors and the like, including a chamber, channels in the walls of the chamber, conduits for a heating fluid leading into the channels, a radiator connected in the system, a heater for the fluid connected with one of the conduits and located below but without the chamber, and a thermostatic device disposed within and influenced by the contents of the chamber for rendering the heater active and inactive.

9. A heating system for motors and the like, including a chamber, channels in the walls of the chamber, conduits for a heating fluid leading into the channels, a radiator connected in the system, a heater for the

fluid connected with one of the conduits and located below but without the chamber, a thermostatic device for rendering the heater active and inactive, and a second heater within one of the conduits and made active and inactive simultaneously with the first-mentioned heater.

10. A heating system for motors and the like, including a chamber, channels in the walls of the chamber, conduits for a heating fluid leading into the channels, a radiator connected in the system, a heater for the fluid connected with one of the conduits and located below but without the chamber, a thermostatic device for rendering the heater active and inactive, and a second heater within one of the conduits and acting under the control of the thermostatic device.

11. A heating system for motors and the like, including a chamber, channels in the walls of the chamber, conduits for a heating fluid leading into the channels, a radiator connected in the system, a heater for the fluid connected with one of the conduits and located below but without the chamber, a thermostatic device for rendering the heater active and inactive, a second heater within one of the conduits for heating its contents to a predetermined temperature and made active and inactive simultaneously with the first-mentioned heater, and an exhaust-manifold associated with one of the conduits for raising the temperature of its contents above that effected by the second heater and which exhaust heater, during the operation of the motor, remains active should the first and second heaters become inactive.

12. A heating system for motors and the like, including a chamber, channels in the walls of the chamber, conduits for heating fluid leading into the channels, a radiator connected in the system, a heater for the fluid connected with one of the conduits and located below but without the chamber, a thermostatic device for rendering the heater active and inactive, a second heater within one of the conduits for heating its contents to a predetermined temperature and made active and inactive simultaneously with the first-mentioned heater, an exhaust-manifold associated with one of the conduits for raising the temperature of its contents above that effected by the second heater and which exhaust heater, during the operation of the motor, remains active should the first and second heaters become inactive, and a connection between the manifold-heated conduit and the heater-containing conduit, whereby the contents of the manifold-heated conduit are conducted to the heater-containing conduit.

13. A heating system for motors and the like, including a chamber, channels in the walls of the chamber, conduits for a heating fluid leading into the channels, a radiator connected in the system, a heater for the fluid connected with one of the conduits and located below but without the chamber, a thermostatic device for rendering the heater active and inactive, a second heater within one of the conduits for heating its contents to a predetermined temperature and made active and inactive simultaneously with the first-mentioned heater, an exhaust-manifold associated with one of the conduits for raising the temperature of its contents above that effected by the second heater and which exhaust heater, during the operation of the motor, remains active should the first and second heaters become inactive, and a controlling device for said conduit and actuatable by the thermostatic device.

14. A heating system for motors and similarly channeled structures including circulating-system-conduits for conveying a heating fluid, a heater effective on the circulating system, a second heater adjacent thereto and also effective on the circulating system for heating a fluid to a predetermined temperature, thermostatically controlled means for causing said heaters to be active or inactive, and an exhaust-manifold associated with and effective on the circulating system for raising the temperature of the fluid above that effected by the second heater and remaining inactive should the second heater become inactive.

15. A motor-heating system including a carbureter chamber, conduits for a heating fluid, a heater for the fluid, means for making the heater active, means automatically for making the heater inactive, comprising a thermostatic device extending into said carbureter chamber and influenced by the temperature of the contents thereof for controlling the electric circuit of said heater, and an electric lamp within the electric circuit for indicating the condition of the heater.

16. A heating system for motors and similarly channeled structures including conduits for conveying a heating fluid, an electric heater effective on the circulating system of the motor, a second heater also effective on the circulating system, and automatic means for causing said heaters to be active and inactive, including a thermostatic device acting under the influence of the heating-fluids.

17. In a heating system for motors and similarly channeled structures including a circulating system, conduits for a heating fluid, a fluid preheating device effective on the circulating system when the system is cool as well as when warm, an exhaust-heating device for one of the conduits effective upon the system independently of the preheating device and a thermostatically oper-

ated controlling device common to the preheating and heating devices for regulating the temperature of each.

18. In a heating system for motors and similarly channeled structures including a circulating system, conduits for a heating fluid, a fluid preheating device effective on the circulating system when the system is cool as well as when warm, an exhaust-heating device for one of the conduits effective upon the system independently of the preheating device, and a thermostatically operated controlling device common to the preheating and heating devices for regulating the temperature of each, including a thermostatic instrumentality.

19. In a heating system for motors and similarly channeled structures including a circulating system, conduits for a heating fluid, a fluid preheating device effective on the circulating system when the system is cool as well as when warm, an exhaust-heating device for one of the conduits effective upon the system independently of the preheating device, a controlling device common to the preheating and heating devices for regulating the temperature of each, including a thermostatic instrumentality, and valve-mechanism automatically operated by the thermostatic instrumentality.

20. In a heating system for motors and similarly channeled structures including a circulating system, conduits for a heating fluid, a fluid preheating device effective on the circulating system when the system is cool as well as when warm, an exhaust-heating device for one of the conduits effective upon the system independently of the preheating device, a controlling device common to the preheating and heating devices for regulating the temperature of each, including a thermostatic instrumentality, and valve-mechanism automatically operated by the thermostatic instrumentality, and a signal-device for one of the heating devices.

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

GEORGE W. DONNING.

Witnesses:
FRANK R. FOWLER,
BERTHA W. ARRISON.