This invention relates to a device for warming the steering wheels of automobiles and other vehicles which are propelled by an internal combustion engine, and utilizes the heat of the exhaust gases for this purpose.

In heating devices as heretofore constructed, wherein the exhaust gases of the engine are utilized for this purpose, the pressure of the gases, as they are expelled from the engine, is depended upon to insure the operation of the heating device. The result has been unsatisfactory for various reasons. The general object of the present invention is to overcome these difficulties by providing practical means, whereby the satisfactory circulation of the heated gases through the steering wheel heating system is effected by suction, preferably the suction induced through the intake manifold by the operation of the engine.

A further object of the invention is to introduce the condensed vapors, after they have circulated through the steering wheel, back into the engine, so that the moisture produced by the combustion of the hydrogen content of the fuel may be utilized for producing steam within the firing chambers of the engine, and thereby removing the carbon therefrom. A certain amount of oil is also present in the exhaust vapor which oils the valves, and insures the proper seating thereof.

Provision is also made by means of a by-pass for using the system to soften and remove the carbon and oil the valves, during the summer months when a heated steering wheel is not desired.

The specific construction of the invention and the principles of its operation will be more fully explained in connection with the accompanying drawings, which illustrate the invention in its preferred form.

In the drawings:

Figure 1 is a diagrammatic view illustrating the general assembly of the invention.

Figure 2 is a sectional view through the steering wheel.

Figure 3 is a vertical section taken through the steering wheel and upper portion of the steering column.

Figure 4 is an enlarged detail sectional view of the connection between the steering wheel and the steering column.

Figure 5 is a plan view of the boss at the upper end of the steering column.

Figure 6 is a detail elevational view of the by-pass.

Figure 7 is a horizontal section taken on the line 7-7 of Figure 6.

The invention is shown in connection with the intake manifold 10 and the exhaust manifold 11 of an internal combustion engine. The steering wheel 12 is secured in the usual manner to the upper end of a steering rod 13, which extends downwardly within the steering column 14. A boss 15, secured to the upper end of the column 14, forms a bearing for the upper end of the rod 13, and has a circular recess in its upper face, which receives the central projecting portion 16 of the hub of the steering wheel 12. The steering wheel hub has also a peripheral annular flange 17, which fits around the upper portion of the boss 15, and screws 18 threaded into the flange 17 engage a peripheral groove 19 in the boss.

The upper face of the boss 15 is provided with two concentric grooves 20 and 21, from which holes 22 and 23 extend downwardly through the boss and terminate in internally threaded nipples 24 and 25, which receive the threaded upper ends of tubes 26 and 27 leading to the exhaust manifold 11 and intake manifold 10, respectively.

The rim of the steering wheel 12 is hollow, as indicated at 28, throughout the circumference of the wheel, except for the distance between two adjacent spokes. The ends of the cavity 28 are connected by passageways 29 and 30, through the hollow spokes to the grooves 20 and 21, respectively. Since these grooves each form a complete circle about the steering rod, the communication between the same and the passageways 29 and 30 is maintained in all positions to which the steering wheel may be turned.

It will be obvious that any suction created in the intake manifold 10 will cause a corresponding suction throughout the heating system, which includes the tube 26, groove 21, passageway 30, cavity 28, passageway 29, groove 20 and tube 27. The hub of the steering wheel has a ground joint to fit with the upper surface of the boss 15, and the
packing ring 31 seated in a peripheral groove in the boss insures an air-tight fit between the same and the flange 17.

In order that the circulation of the hot gas through the wheel 12 may be conveniently controlled, a tapered rotary valve or stop cock 32 is seated in one of the passage-ways, as 30, and may be yieldingly held to its seat by a spring 33. This valve may be conveniently turned to shut off or open up the circulation as desired. A by-pass 34 is connected to the tubes 26 and 27 near their lower ends by T joints 35 and 36, respectively. A suitable three-way valve 37 is mounted in one of these T joints, so as to cause circulation through the steering wheel, or cut off the circulation from the steering wheel and direct it through the by-pass 34.

In the usual operation of the invention in cold weather, the valve 37 will be so adjusted as to cause the circulation to take place through the steering wheel, and the extent of this circulation may be controlled, while driving, by means of the valve 32. Some of the gases which are discharged through the exhaust manifold 11 will, therefore, be drawn by the suction of the engine through the tube 26 into and through the cavity in the steering wheel, so that the latter will be warmed, while the oil and water vapor contained in the gases will be partly or wholly condensed and drawn through the tube 27 and the manifold 10 back into the firing chambers. The moisture thus introduced into the firing chambers acts as a de-carbonizer, and the condensed oil vapor oils the valves, and causes them to seat tightly. Owing to the considerable amount of moisture which condenses in the cavity 28, it is necessary at times to drain the same, so that it will not interfere with the passage of the hot exhaust gases, and for this purpose a plug 38 may be provided in the rim.

The specific construction of the connection between the steering wheel and the upper part of the steering column is also particularly well suited for the attachment of a lock to prevent the unauthorized movement of the steering gear. As herein shown, the lower rim of the boss 15 is extended at one side to form an ear 39, which is perforated to receive a locking bolt 40. As shown in Figures 3 and 4, this locking bolt has a reduced upper end portion 41, which is adapted to be received in a perforated boss 42 formed on one of the spokes of the steering wheel, and the bolt may be retained in this position by a suitable lock 43, so as to lock the steering wheel against movement relative to the steering column 14.

For the successful operation of a heating device of this kind, there must be a suction created of some kind to draw the heated vapor through the hollow parts of the wheel. A wheel can not be heated successively by merely using a cut out in the exhaust pipe, and trying to force the exhaust gases by pressure through and around the wheel. The connection for inducing the suction should be as close to the motor as possible, and preferably at the intake manifold, as herein shown. By this means, the exhaust gases are drawn quickly into the rim of the wheel before they have time to cool. After they reach the large cavity in the rim of the wheel, they condense to form a fluid composed of water with some oil, which is then mixed with air in the intake manifold and drawn back into the motor, so that it acts to save gas, oil the valves and remove carbon, or prevent its formation in the cylinders.

While we have shown and described the specific construction of one form in which our invention may be embodied, it is to be understood that this is merely illustrative, and that various modifications may be made in the size, shape and general arrangement of the various elements, and in other details of construction without departing from the salient features of the invention as expressed in the claims.

What is claimed is:

1. In a motor driven vehicle, the combination with an intake manifold and an exhaust manifold of the motor, of a steering wheel having a rim with a cavity extending through the major portion of its length, tubes connecting the end portions of said cavity respectively with the exhaust manifold and the intake manifold of the motor, a bypass connecting said tubes, and a three-way valve for directing the gases from the exhaust manifold through the cavity in the steering wheel or through the by-pass.

2. In a motor driven vehicle, the combination with an intake manifold and an exhaust manifold of the motor, of a steering column, a steering rod mounted within said column, a steering wheel secured to the upper end of said rod and having a rim with a cavity extending through the major portion of its length, a boss secured to the upper end of the column against which the wheel hub rests, said boss having two concentric grooves in its upper face beneath the wheel hub in communication with the respective end portions of said cavity, and means for connecting said grooves respectively with the intake manifold and the exhaust manifold of the motor.

3. In a motor driven vehicle, the combination with an intake manifold and an exhaust manifold of the motor, of a steering column, a steering rod rotatably mounted within said column, a steering wheel secured to the upper end of said rod and having a rim with a cavity extending throughout the major portion of its length, a boss secured to the upper end of the column against
which the wheel hub rests, said boss having a recess in its upper face into which the central portion of the wheel hub fits and having two concentric grooves in its upper face beneath said hub and encircling said central portion, certain spokes of said wheel having passageways connecting the end portions of the rim cavity with the respective grooves in any position of the wheel, tubes leading downwardly from said grooves, and means for connecting said tubes respectively with the intake manifold and the exhaust manifold of the motor.

6. In a motor driven vehicle, the combination with an intake manifold and an exhaust manifold of the motor, of a steering column, a steering rod rotatably mounted within the column, a steering wheel secured to the upper end of said rod, a boss secured to the upper end of said column with the hub of the steering wheel resting thereon, said hub being provided on its upper face with two concentric grooves, said steering wheel having a rim hollow throughout its circumference except for a portion between two adjacent spokes, said adjacent spokes having passageways leading from the cavity of the rim to the respective grooves, each of said grooves forming a complete circuit about the steering rod so that communication between the grooves and the respective passageways is maintained in all positions of the steering wheel, and means connecting said grooves respectively to the intake manifold and the exhaust manifold.

7. In a motor driven vehicle, the combination of a steering column, a steering rod journaled within said column, a steering wheel secured to the upper end of said rod and having a rim with a cavity therein, a boss having a circular recess in the center of its upper face into which the central portion of the wheel hub fits and having two concentric grooves in its upper face beneath said hub and encircling said central portion, an annular flange on the periphery of said hub encircling the boss, a packing ring forming a seal between the boss and said flange, spokes on said wheel having passageways connecting the end portions of the rim cavity with the respective grooves in any position of the wheel, tubes leading downwardly from said grooves, and means for connecting said tubes respectively to the intake manifold and the exhaust manifold of the motor.

5. In a motor driven vehicle, the combination with an intake manifold and an exhaust manifold of the motor, of a steering wheel having three or more spokes and having a rim made hollow throughout its circumference except for that portion between two adjacent spokes, said adjacent spokes having passageways connecting with the cavity of the rim, a steering column, a boss secured to the upper end of the steering column and having two grooves in its upper face which are covered by the hub of the wheel, said grooves communicating respectively with the passageways in said adjacent spokes, and means for connecting the grooves respectively with the exhaust manifold and the intake manifold of the motor.

In testimony that we claim the foregoing as our own, we have hereto affixed our signatures.

ALEXANDER D. WHITE.
JAMES ROY RILEY.