

F. B. BROCK.  
AUTOMOBILE.

APPLICATION FILED APR. 11, 1904.

NO MODEL.

2 SHEETS—SHEET 1.

FIG. 1.

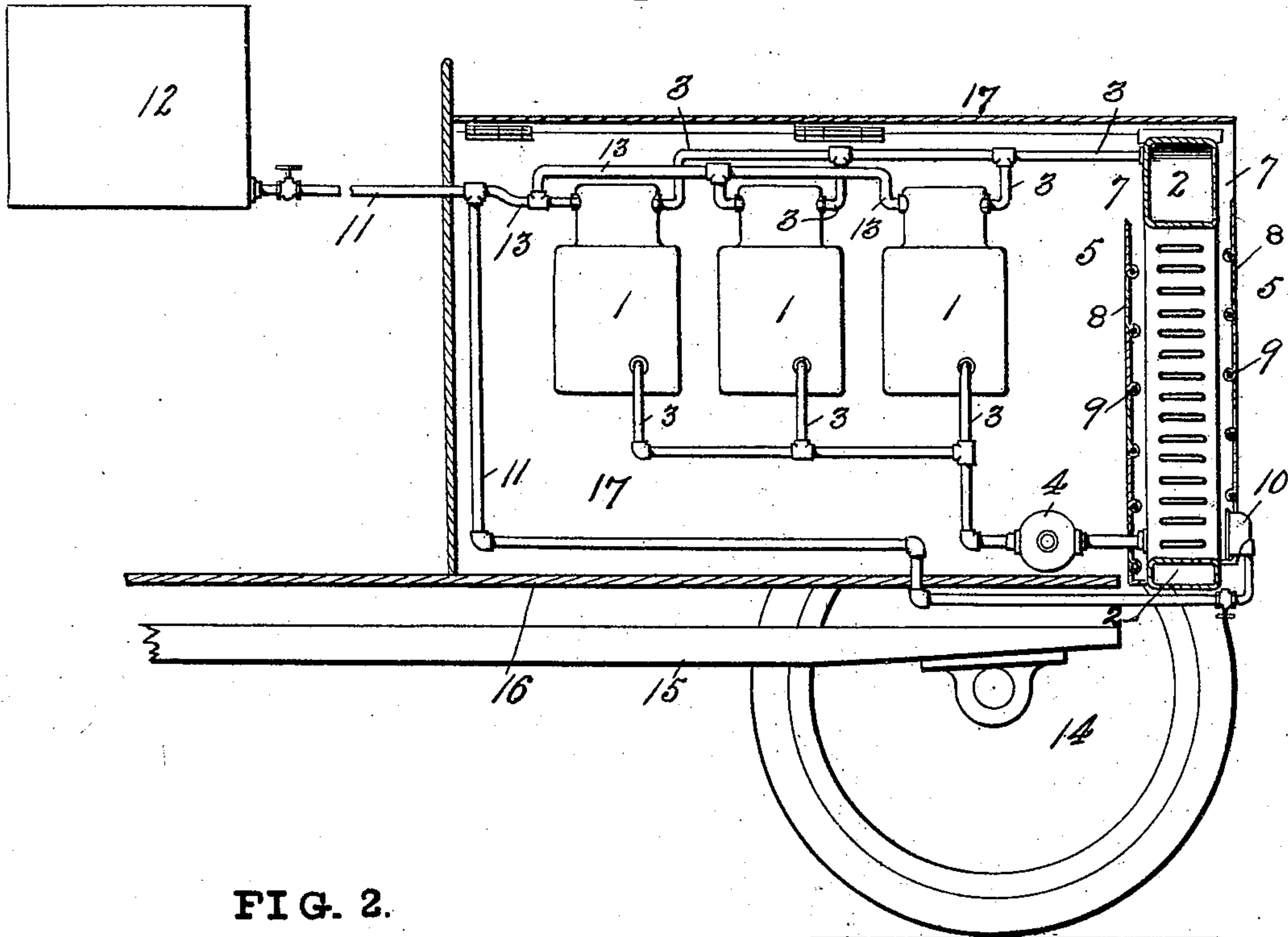


FIG. 2.

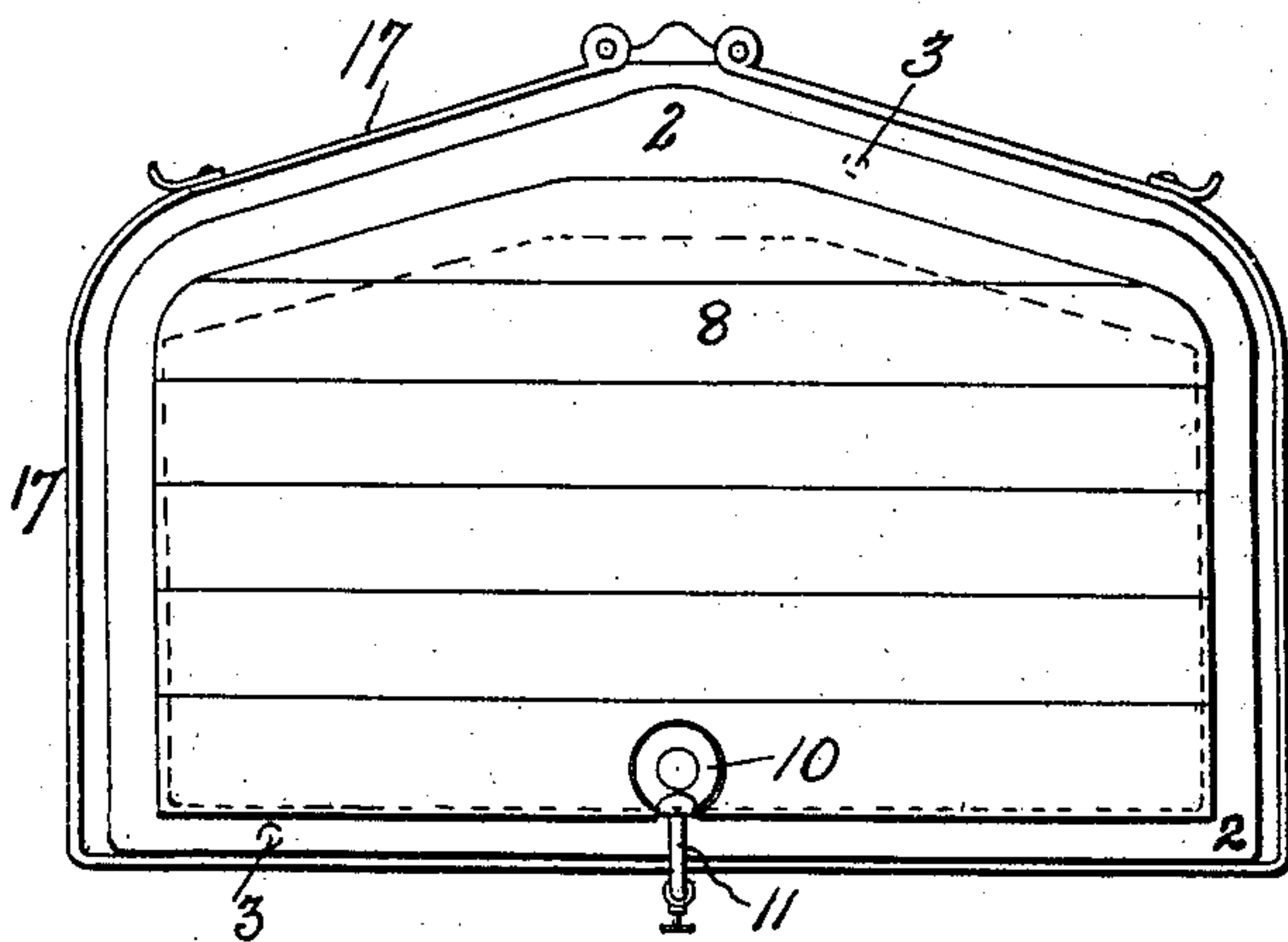
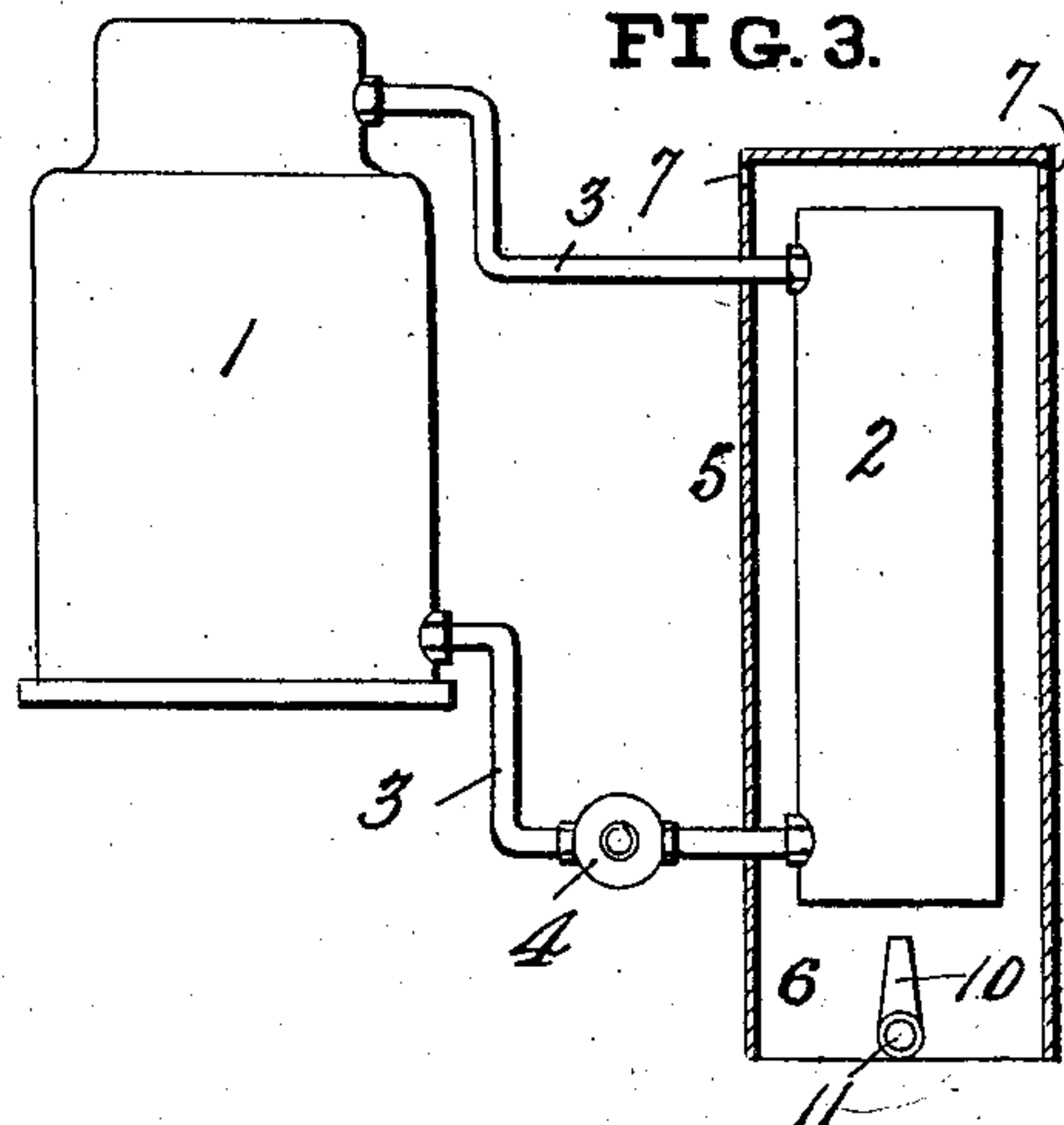


FIG. 3.



WITNESSES:

Chas. K. Davis.

S. Washington

INVENTOR

F. B. Brock

No. 774,556.

PATENTED NOV. 8, 1904.

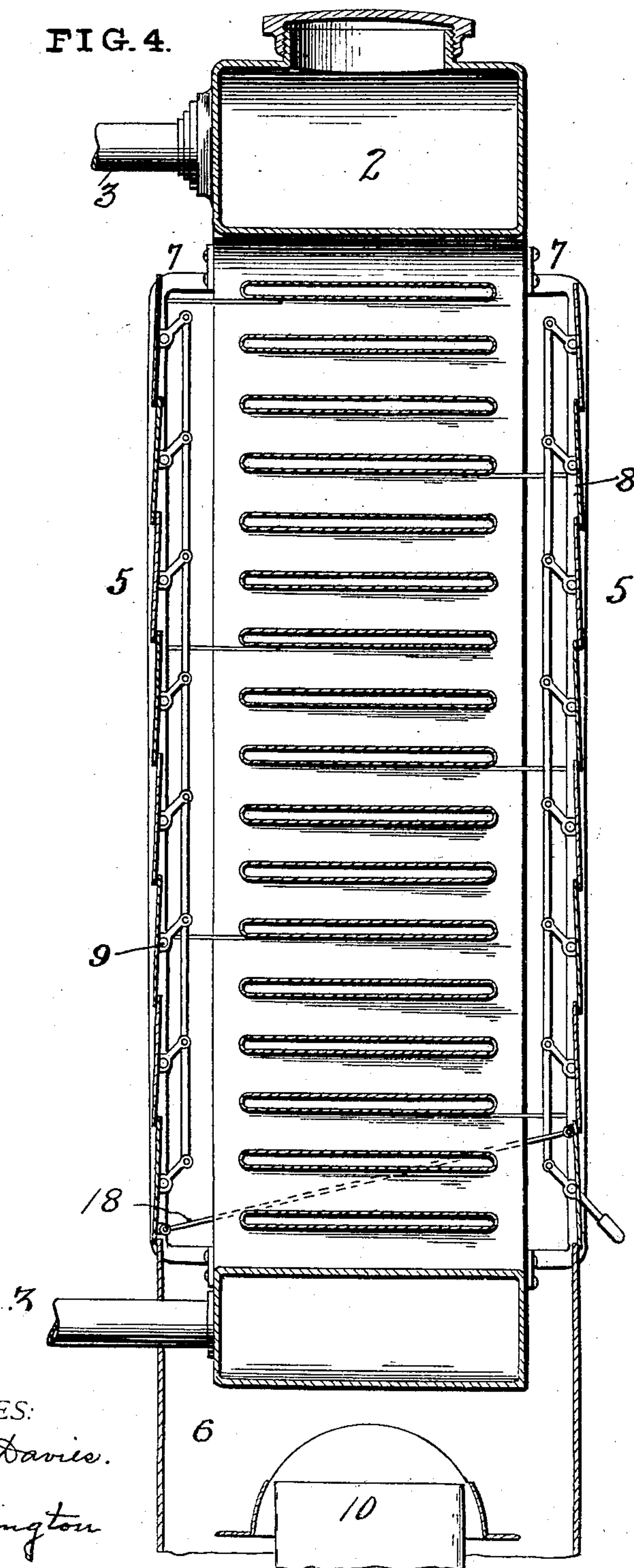
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2 SHEETS—SHEET 2.

FIG. 4.



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# UNITED STATES PATENT OFFICE.

FENELON B. BROCK, OF WASHINGTON, DISTRICT OF COLUMBIA.

## AUTOMOBILE.

SPECIFICATION forming part of Letters Patent No. 774,556, dated November 8, 1904.

Application filed April 11, 1904. Serial No. 202,616. (No model.)

*To all whom it may concern:*

Be it known that I, FENELON B. BROCK, of Washington, District of Columbia, have invented certain new and useful Improvements in Automobiles; and I do hereby declare the following to be a full and clear description thereof.

My invention relates to the prevention of freezing of the water in water-cooled motors in automobiles. Heretofore this has been a serious and annoying problem. During last winter the water in the cooling system in many cars froze, invariably bursting the radiator of the system. In some instances it was possible to patch the radiators; but in others the radiators were a total loss and had to be replaced, owing to the many places in each which were ruptured by the formation of ice therein. The cost of replacing a radiator varies from thirty dollars to sixty dollars. The next vulnerable place in the water system is the water-jacket. The radiator freezes first, because of its necessarily-exposed position, the water-jacket of the engine being somewhat more protected. In order to get great radiation from the water-jacket and the radiator, they are almost universally made of copper, because of its high conductivity, and the copper walls are made very thin to further this action. Owing to this construction for attaining excessive radiation, the water in the radiator and jacket is peculiarly susceptible to congeal whenever the air is at the temperature of freezing or below if the engine is not running and the water is cool.

The water in the radiator, owing to the above conditions, freezes more quickly than the tubes forming the circulating connections with the water-jacket, because of the general practice of making these connecting-tubes with somewhat-thicker walls than those of the radiator and jacket and the consequent longer time to establish an equilibrium between a freezing temperature and the incased water in the tubes. The next freezing occurs in the water-jacket.

Persistent and continued effort by those skilled in the art of automobile construction, by those vitally interested in the commercial success of the industry, and by those who use

the gasoline-cars for business or recreation has been made to find a remedy for this serious defect. This effort has extended over a series of years. Several solutions have been offered as a remedy by these investigators.

Various chemicals have been placed in solution in the water. Chlorid of calcium has been largely used. An examination of the engine-cylinder exposed to this solution for quite a time shows destructive corrosion. It is not effective at very low temperatures. Glycerin, common salt, a high-flash oil, and alcohol have also been mixed with the water, securing for a time good results, except in extreme temperatures. The vital defect, however, with all these solutions is that, owing to the higher rate of volatilization of these described chemicals than that of water, the strength of the mixture soon becomes impaired and the operator of the water-cooled gasoline-car has no means of knowing the degree of impairment of the mixture. To be sure of its strength, the mixture must be frequently drawn off and an entirely new mixture substituted. The residual mixture in the case of calcium chlorid if left in the pipes and additional mixture added has been proved in practice to have deleterious results. Outside of the before-described means no invention has been proposed or been put in practice, although hundreds have striven to accomplish better results. Replies received to inquiries directed to over thirty makers of gasoline-automobiles give no results other than those above recited, and they state that there is a great demand for more efficient means for the prevention of freezing in water-cooled gasoline-cars.

So great has been the annoyance caused by the recited freezing and the defective means employed for its prevention that a number of manufacturers have discarded the water-cooled motor and put on the market air-cooled motors. Already a considerable market has sprung up, mainly among motor-car owners who have been subjected to these expensive water-cooled annoyances. Systematic effort is now being made to exploit the "waterless" gas-motor car for these reasons. The invention entirely does away with these defects.

It consists in introducing into the water-



cooled gas-motor car a heater for causing a circulation of warm or hot water through the tubes of the water-circulating system.

It further consists in applying to such a heating system, in connection with the radiator located in the front of the car, a means for opening and closing the front of the bonnet inclosing the radiator and also means for opening and closing the front and rear of the radiator-casing.

Figure 1 represents a side elevation and diagrammatic view of the front portion of the automobile. Fig. 2 is a front elevation of the radiator and bonnet. Fig. 3 is a diagrammatic view showing the circulatory system. Fig. 4 is an enlarged detail edge view of the radiator, showing a means for opening and closing the front and rear walls of the same.

In the drawings, 1 represents the water-jackets of the engine-cylinders; 2, a radiator in the front of the car or bonnet; 3, water-tubes connecting the radiator at top and bottom and leading to the opposite ends of the water-jackets 1; 4, a circulating force-pump located in one of the tubes 3; 5, a casing inclosing the radiator; 6, a burner-chamber for the casing 5; 7, openings at the top of the casing to permit the escape of heat; 8, pivoted slats constituting one means of opening and closing the walls of the casing 5; 9, pivots for the slats by means of which the latter may assume either a horizontal or vertical position; 10, heaters or burners for heating the radiator; 11, a fuel-supply pipe leading from heater 10; 12, a gasoline-tank on the car with which pipe 11 connects; 13, pipes leading from the gasoline-tank to the cylinders of the engine inside the water-jackets 1; 14, the wheels of the automobile; 15, the frame or chassis; 16, the body of the car; 17, the bonnet; 18, a link connected to the radiator opening and closing means for operating the same.

Means may be employed for locking the pivoted slats in freezing weather in an open or in a closed position.

When the automobile is left in an exposed position when the engine is not running, it is desirable to incase the radiator in order that the products of combustion may not be dissipated by the air, and sufficient protection should be given the heater to prevent its extinguishment. This result is accomplished by providing a casing in the front of the bonnet, in the rear, or both in front and rear.

The incasing of the radiator is not limited to the exemplifying means shown in the draw-

ings. Any means for closing or opening the radiator may be employed, such as an asbestos curtain.

The heater may be of any type or kind—oil, gas, electric, or the like. The best results are probably secured by placing the heater under or alongside the radiator; but this location is unessential. The heater may be placed in contact with the water-jacket or along any of the connecting-tubes.

The pump generally used in connection with the water-circulating system is of a type having the water-impelling devices running loosely in the casing, and the circulation of water by gravity through the pump-casing is not retarded in any material degree. If the parts of the pump impede the circulation to any great degree, a by-pass around the pump may be employed or the pump itself inclosed in a jacket and made a part of the circulating system.

I claim—

1. In an automobile, the combination of a car, a water-circulating system for the motor located thereon, and a heater for said system for generating heat independent of the motor.

2. In an automobile, the combination of a car, a water-circulating system for the motor located in the front of the car, a bonnet or hood upon the front of the car and a heater for said circulating system for generating heat independent of the motor.

3. In an automobile, the combination of a car, a radiator located in the front of the car, a bonnet upon the front of the car, and a heater for imparting heat to the radiator.

4. In an automobile, the combination of a car, a water-jacket for the engine, a radiator in the front of the car, tubes connecting said radiator and jacket, and means for inclosing and opening the radiator-casing.

5. In an automobile, the combination of a car, a water-jacket for the engine, a radiator in the front of the car, means for closing and opening the radiator-casing, and a heater for the radiator.

6. In an automobile, the combination of a car, a gasoline-tank thereon, a water-cooling system for the motor, a heater for said system and connections between said tank and heater.

In testimony whereof I have affixed my signature in the presence of two witnesses.

FENELON B. BROCK.

Witnesses:

LILIAN BROCK,  
PHILO BURRITT.