May 20, 1924. 1,495,088

J. E. LARSON

COOLING SYSTEM FOR INTERNAL COMBUSTION ENGINES

Filed April 14, 1922 2 Sheets-Sheet 1

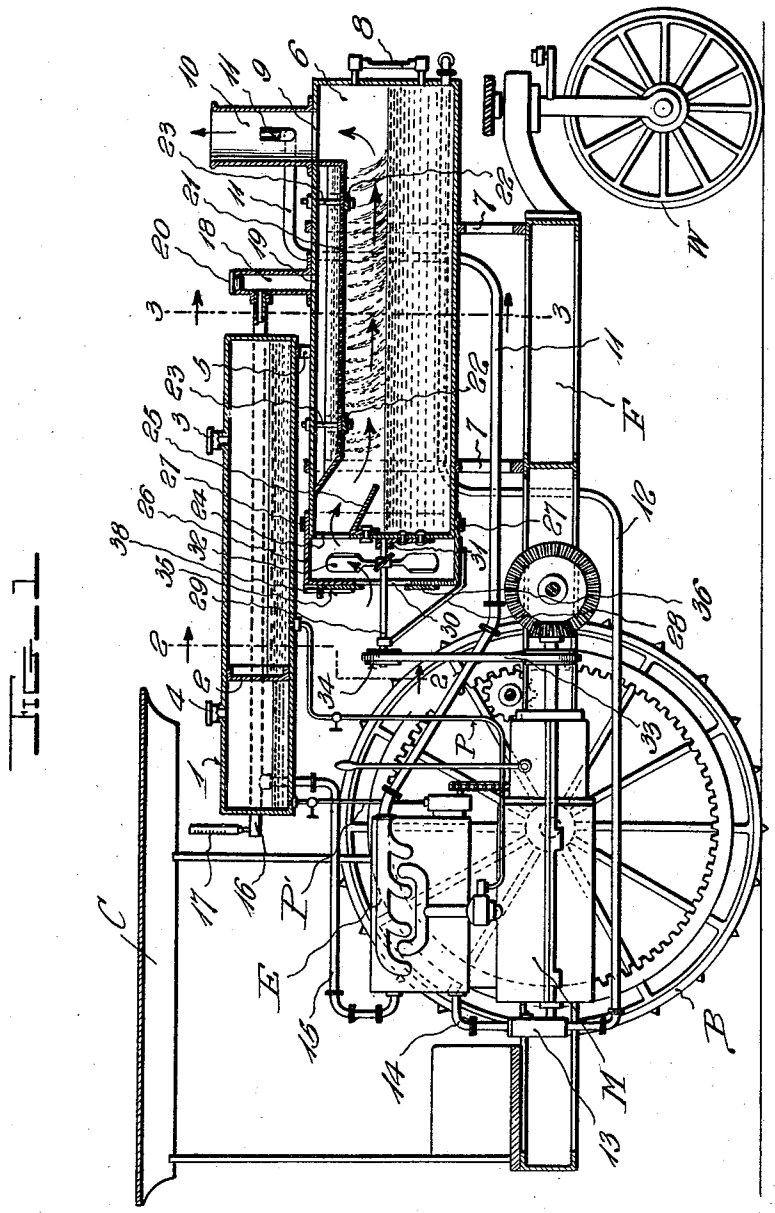


Fig. 1

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FIG. 2

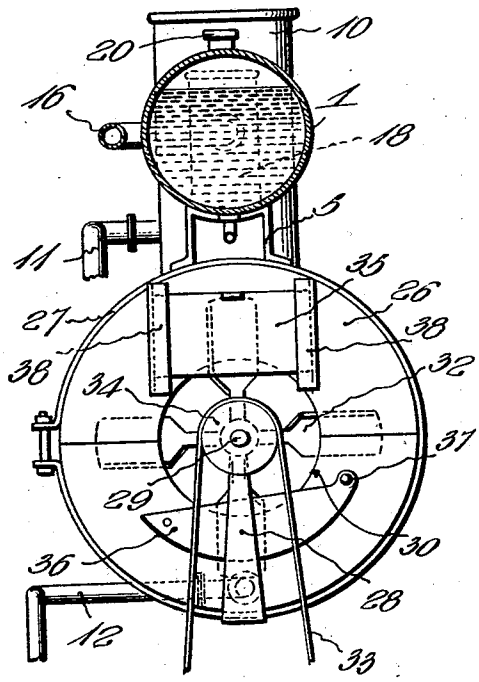


FIG. 3

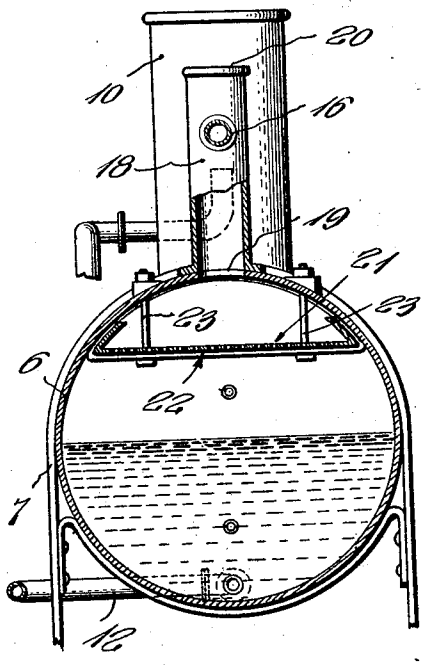
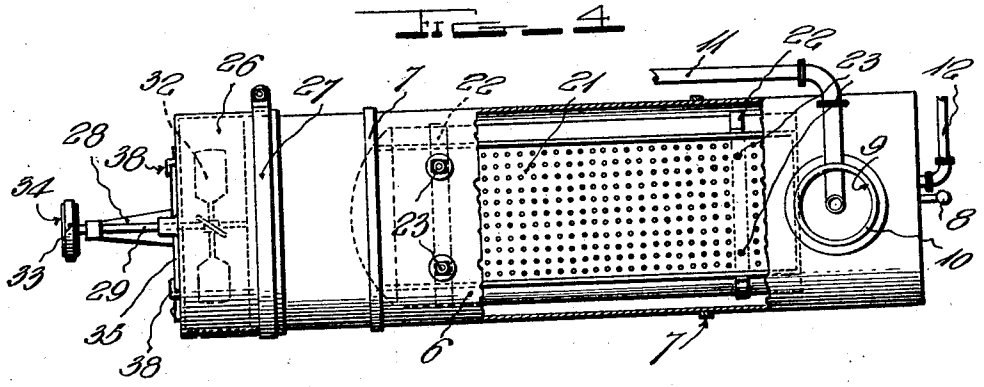


FIG. 4



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UNITED STATES PATENT OFFICE.

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COOLING SYSTEM FOR INTERNAL-COMBUSTION ENGINES.

Application filed April 14, 1922. Serial No. 552,769.

To all whom it may concern:

Be it known that I, JOSEPH E. LARSON, a citizen of the United States, residing at Clarks, in the county of Merrick and State of Nebraska, have invented certain new and useful Improvements in a Cooling System for Internal-Combustion Engines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved cooling system for internal combustion engines and will be principally used in connection with an engine forming a portion of a tractor such as is used for drawing agricultural implements across a field or for running threshing machines.

One object of the invention is to provide this cooling system with an improved type of water cooling and reservoir means which will include a reservoir tank from which the water may be drawn to cool the motor and means for causing water which enters the tank to pass downwardly to the main body of water therein in the form of small streams which will pass through a cold air blast and thus be cooled.

Another object of the invention is to so construct this tank that it may be provided at one end with an opening communicating with a fan housing so that air may be forced through this opening into the tank and caused to pass longitudinally through the tank at about the normal water level and thus the water passing into the tank cooled and the main body of water in the tank kept cool.

Another object of the invention is to so construct this tank that it may be provided with a neck extension providing an outlet for the air which passes through the tank and resembling the smoke stack of a steam tractor engine.

Another object of the invention is to so construct this cooling system that the exhaust pipe of the motor may be extended into the stack of the water tank and thus the exhaust port serve to create a suction in this tank so that the passage of air through the tank will be assisted.

Another object of the invention is to so construct this cooling system that when the engine and water tank are put in place and a fuel and oil tank put in place, the tractor will resemble in appearance an ordinary tractor and the water and fuel and oil tanks serve as means for counterbalancing the weight of the cab portion of the tractor and thus prevent the tractor from having any tendency to tilt when in use.

This invention is illustrated in the accompanying drawings wherein:

Figure 1 is a view showing the tractor in longitudinal section and provided with an internal combustion motor having the improved cooling system.

Figure 2 is a vertical sectional view taken along the line 2—2 of Fig. 1.

Figure 3 is a vertical sectional view taken along the line 3—3 of Fig. 1.

Figure 4 is a view showing the improved cooling and water storage tank principally in top plan and partially broken away and shown in longitudinal section.

The tractor with which the motor and cooling system is shown used in connection with is provided with a frame F having a cab indicated in general by the letter C, front steering wheels W and rear wheels which are termed bull wheels and indicated by the letter B. These wheels B are rotated from the internal combustion motor M and will be provided with a conventional structure of carbureter to which leads a pipe P so that gasoline in the forward compartment of the tank 1 may be fed to the carbureter. A partition 2 is provided in this tank and divides the tank into a forward compartment to receive the gasoline through the filling neck 3 and a rear compartment to receive oil through the filling neck 4. A feed pipe P′ extends from the oil compartment so that oil may be supplied to the oil distributing mechanism of the engine or motor M. This fuel and oil tank 1 extends longitudinally of the tractor and has its forward end portion resting upon a saddle 5 carried by the water tank or reservior 6 which extends longitudinally of the tractor and is supported by yokes or bands 7 supported upon the main frame F of the tractor. This water tank or reservoir 6 is provided at its forward end with a water gage 8 and adjacent its forward head is provided with an opening 9 which communicates with a neck or stack 10 which resembles the smoke stack of a steam-operated tractor. The ex-

haust pipe 11 which extends from the exhaust manifold E of the motor is carried forwardly beneath the tank 6 and then carried upwardly and forwardly and extended into the stack 10 with its forward end portion extended upwardly so that the exhaust gases from the motor will pass out through the stack and serve to form a draft through the water tank. The pipe 12 which conveys water to the pump 13 of the motor extends from the lower end portion of the forward head of the tank 6 and after being carried to one side extends rearwardly and after being carried rearwardly to a point adjacent the rear end of the tank is carried downwardly and then extended rearwardly beneath the cab and upwardly to engage and communicate with the pump. The pump can thus draw water through the elongated pipe and then pump this water through the pipe 14 and into the water jacket of the motor. By having the water pass through this elongated pipe 12, it will be given additional opportunity to become cooled before injected into the water jacket of the motor. The outlet pipe 15 of the water jacket extends forwardly over the motor and is then extended upwardly and communicates with a pipe 16 which carries a thermometer 17 at is rear end and extends forwardly to one side of the oil and gasoline tank 1. The pipe 16 has its forward end communicating with a neck 18 which constitutes an inlet neck for the tank 6 and has its lower end enclosing an inlet opening 19 of the tank and its upper end normally closed by a removable plug 20. It will thus be seen that the water from the pipe 16 may flow into the neck 18 and from this neck 18 through the opening into the cooling and storage tank 6 and that further when it is necessary to replenish the supply of water in the storage tank, the plug 20 may be removed and water poured into this neck through the open upper end. The water which passes from the pipe 16 into the neck 18 and through this neck 18 into the tank 6 is hot water and this hot water must be cooled before it reaches the main body of water in the lower portion of the tank. There has therefore been provided a pan 21 which is secured in the upper portion of the tank. This pan which is perforated as shown clearly in Fig. 4 extends longitudinally of the tank and is supported by strips 22 and bolts 23, the strips 22 extending transversely of the pan and having upturned end portions as clearly shown in Fig. 3 and the bolts 23 extending through the tank and having securing nuts upon their upper ends. By providing this pan, the water which flows through the neck 18 into the tank will be caught and after spreading out in the pan will drain through the openings of the pan in relatively fine streams. The head at the rear end of the tank is provided with an air inlet opening 24 through which air may pass into the tank and below this opening 24 there has been provided a plate 25 which extends forwardly and downwardly parallel to the end wall of the pan as shown in Fig. 1 thus causing the cold air which will be driven through this opening 24 to be directed forwardly and downwardly beneath the pan. This cold air which moves forwardly through the tank acts upon the fine streams of water flowing from the pan and these fine streams of water will be broken up and driven forwardly before dropping into and mixing with the main body of water within the tank. It will thus be seen that this water will be cooled before reaching the main body of water and further that since the air blast passes over the surface of the water in the tank, the water will be cooled in a very efficient manner. In order to supply air to cool this water, there has been provided a fan housing 26 which is secured upon the rear end portion of the tank by clamping band 27. This fan housing carries a bearing bracket 28 which extends rearwardly from beneath the housing and serves to rotatably mount the outer end portion of the fan shaft 29 which extends into the housing through the opening 30 and has its inner end portion journaled in a bearing 31 secured against the rear head of the tank 6. The fan 32 is secured upon the shaft 29 within the fan housing and it will be readily seen that when this shaft is rotated by means of the belt 33 which passes around the pulley 34, air will be sucked into the housing through the opening 30 and driven forwardly through the opening 24 into the tank 6. Shutters 35 and 36 are carried by the fan housing so that the passage of air through the opening 30 may be controlled. The shutter 36 is pivotally mounted as shown at 37 and will be swung upon this pivot to extend across the opening 30 the desired amount and the shutter 35 is slidably mounted in tracks 38 so that it may be moved to extend across the opening 30 the desired amount. It will thus be seen that the amount of air passing into the fan housing through the opening 30 can be controlled and proper cooling of the water obtained. From the above description, it will be readily seen that when the tractor is in operation, the water when leaving the motor will pass through pipes 15 and 16 into the neck 18 and will pass downwardly into the pan 21 where it will spread out and pass through the openings of the pan in fine streams. The air which is forced into the tank through the opening 24 by means of the fan in the fan housing will pass forwardly and will act upon this water which is passing from the pan in fine streams and will break up these streams into small drops

which will be driven forwardly before mixing with the main body of water in the tank. The main body of water will be cooled in this manner and as it passes out through the pipe 12 and moves inwardly to the pump 13, it will be further cooled. This water cooling system will thus serve to cool the water in a very effective manner.

I claim:

1. A water storing and cooling tank for use in a cooling system for a water cooled motor, said tank having an air inlet in one end and an air outlet in its other end and having its upper portion provided with a water inlet intermediate the air inlet and outlet whereby water passing from the inlet to a main body of water in the tank may be engaged and broken up by a blast of cooling air passing through the tank above the main body of water, a fan housing at the end of the tank and having a head provided with an air inlet opening, a bearing carried by the tank within the housing, a bearing bracket carried by the housing and having a bearing opposite the bearing within the housing, a fan shaft extending through the opening of the housing and journaled in the bearings, a fan carried by the shaft within the housing, and means permitting rotation of the fan shaft.

2. The structure of claim 1 and a pan in the housing extending between the air inlet and outlet and beneath the water inlet and provided with a plurality of perforations whereby water passing through the water inlet may be caught in the pan and pass through the perforations thereof as a plurality of relatively fine streams.

3. The structure of claim 1 and a pan in the housing extending between the air inlet and outlet and beneath the water inlet and provided with a plurality of perforations whereby water passing through the water inlet may be caught in the pan and pass through the perforations thereof as a plurality of relatively fine streams, the end portion of the pan adjacent the air inlet being inclined to provide an air deflecting surface for directing air downwardly beneath the pan, and an air directing plate extending from the head of the tank below the air inlet and downwardly inclined.

In testimony whereof I have hereunto set my hand.

JOSEPH E. LARSON.