H. FORD.

ENGINE AND RADIATOR ASSEMBLY.

APPLICATION FILED JULY 17, 1918.

1,312,476.

Patented Aug. 5, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

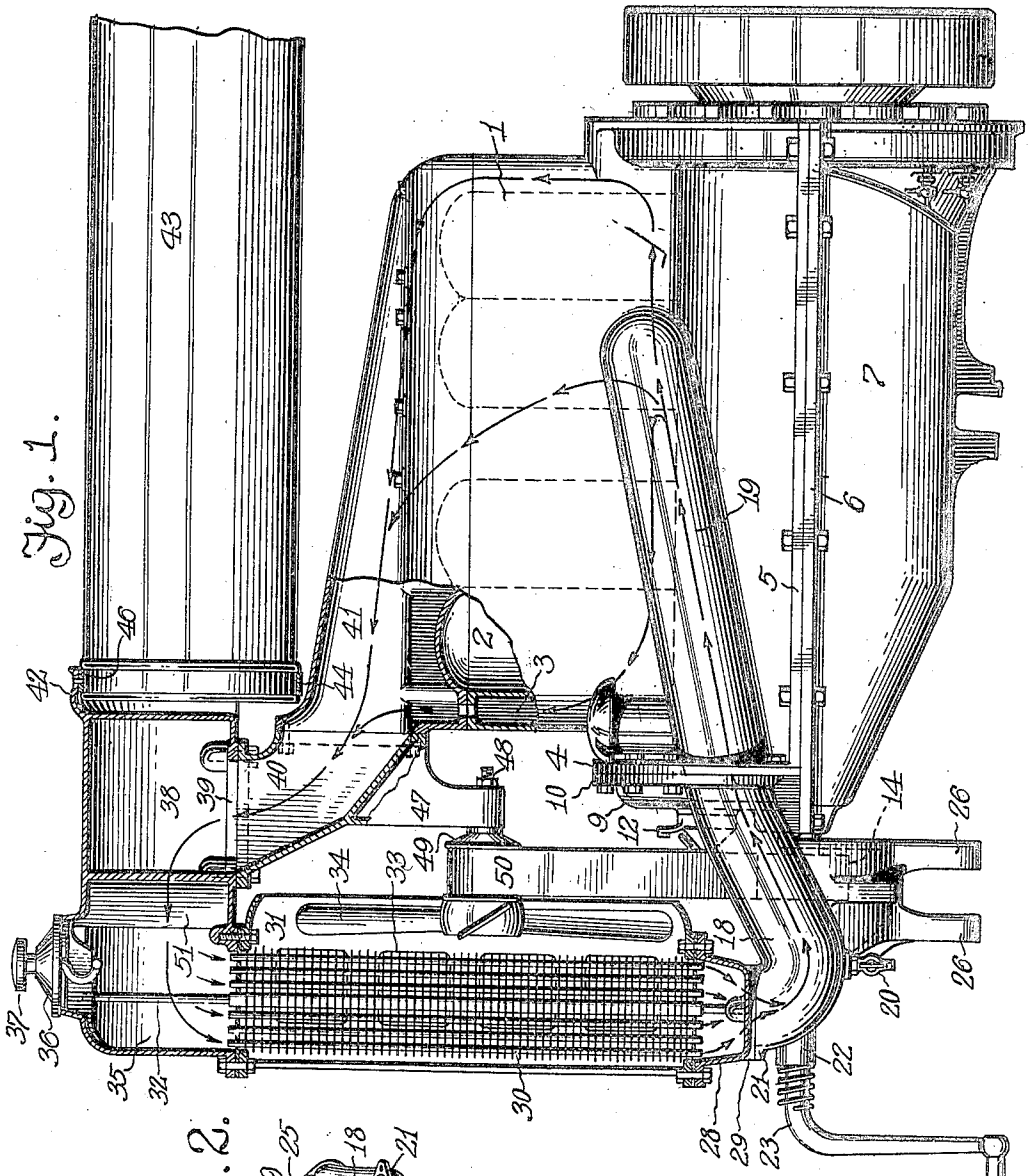
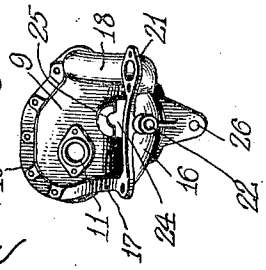


Fig. 2.



Witness

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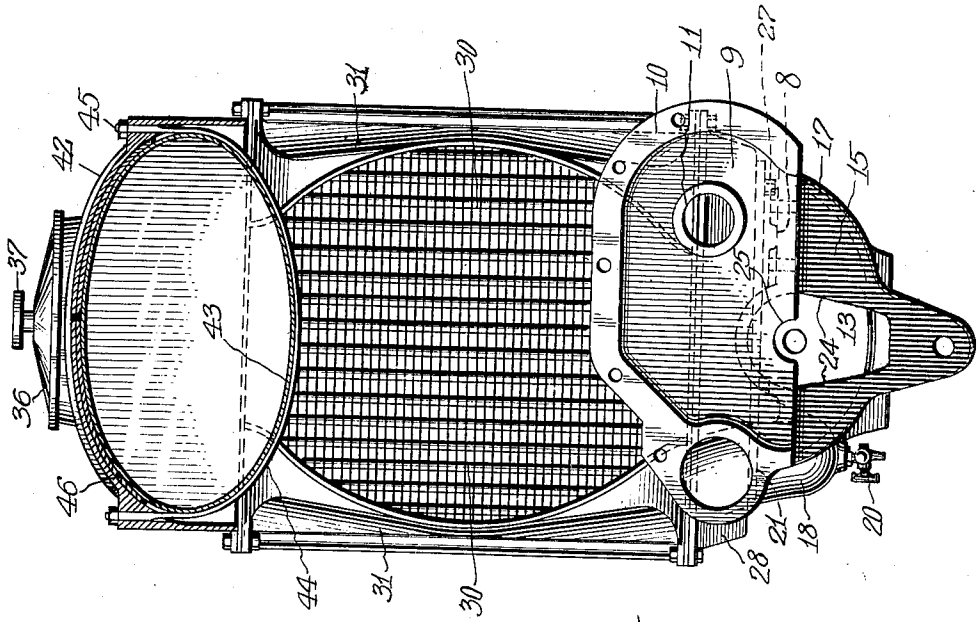


Fig. 4.

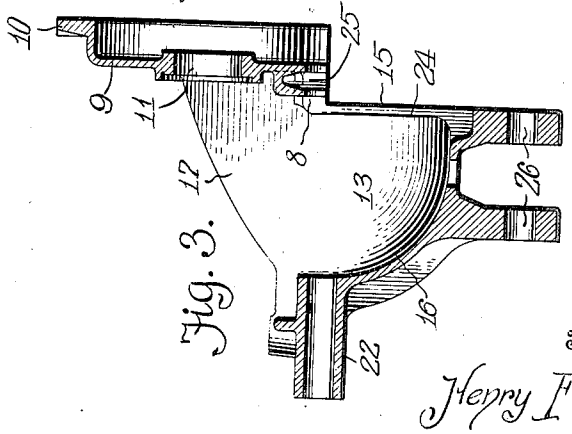


Fig. 3.

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HENRY FORD, OF DEARBORN, MICHIGAN.

ENGINE AND RADIATOR ASSEMBLY.

1,312,476. Specification of Letters Patent. Patented Aug. 5, 1919.

Application filed July 17, 1918. Serial No. 245,429.

To all whom it may concern:

Be it known that I, HENRY FORD, a citizen of the United States of America, residing at Dearborn, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Engine and Radiator Assemblies, of which the following is a specification, reference being had therein to the accompanying drawings.

The tractor which I am now extensively placing on the market includes a novel engine and radiator assembly, and particularly a cylinder front cover which affords a well for a fan pulley, a bearing for a starter shaft, and a support for a radiator. The radiator is mounted between the cylinder front cover and a top tank which is braced relative to the cylinder block by a tank connection, and said connection supports a fan bracket and together with the top tank assists in supporting the main fuel tank of the tractor.

The assembly as outlined above permits of that part of the tractor being expeditiously and economically manufactured, and the construction entering into the assembly will be hereinafter considered and then claimed.

Reference will now be had to the drawing, wherein—

Figure 1 is a side elevation of the engine and radiator assembly, partly broken away and partly in section;

Fig. 2 is a perspective view, on a small scale, of the cylinder front cover;

Fig. 3 is a longitudinal sectional view of the same, and

Fig. 4 is a rear elevation of the cylinder front cover and radiator, showing the fuel tank in cross section.

In the drawings, the reference numeral 1 denotes a cylinder block which—*inter alia*—has cylinders 2, a water jacket 3, a front flange 4, and bottom flanges 5, said bottom flanges being connected to the flanges 6 of a crank case 7. The flanges 6, at the forward end of the crank case 7, protrude past the front flange 4 of the cylinder block, and connected to the forward end of the crank case and resting thereon is a horizontal wall or ledge 8 of a cylinder front cover 9, said cover having a flange 10 connected to the flange 4 of the cylinder block. The cover 9 has an opening and connection 11 for a commutator 12, and the horizontal wall or ledge 8 of said cover is at the rear marginal edge of a well 13 providing clearance for a belt pulley 14 which is mounted on the forward end of the engine crank shaft (not shown). The well 13 has a rear wall 15 and a curved front wall 16, with a flange or side wall 17 at one side of the well and a bottom radiator connection 18 at the other side of said well.

The bottom radiator connection 18 is somewhat in the form of an elbow formed integral with the cylinder front cover, said connection having the rear end thereof terminating at the flange 10 of said cover so as to communicate with an angularly disposed jacket connection 19 forming part of the cylinder block 1. The connection 18 has a drain cup 20 and the forward end thereof terminates at a lateral flange 21 forming the front marginal edge of the well 13.

The curved wall 16 of the well 13, below the flange 21 has a bearing 22 for a starter shaft 23, said bearing longitudinally alining with an opening 24 in the rear wall 15 of the well and a cut away portion 25 of the cover 9 so that the starter shaft may be coupled to the crank shaft of the engine.

The bottom of the well 13 has depending apertured ears or trunnion supports 26 adapted to be connected to the front axle assembly of the tractor, as disclosed in my pending application filed April 15, 1918, Serial No. 228,590.

Suitably connected to the flange 21, as at 27, is a bottom radiator tank 28 having a connection or apertured boss 29 to register with the radiator connection 18 of the cylinder front cover.

Connected to the bottom radiator tank 28 is a radiator comprising a core 30, side members 31, and an overflow pipe 32, said overflow pipe extending through the bottom of the tank 28. The radiator core 30 is of a conventional form and the side members have openings 33 so that air may circulate through the sides of the radiator. The side members 31 have the rear edges thereof shaped, as best shown in Fig. 3, to provide an inclosure for a rotary fan 34, which assists in cooling water in the radiator, by sucking air through the fins and around the tubes forming the core of the radiator. The radiator core is constructed as a unit and attached to the upper end thereof is a top radiator tank 35 having a cover 36 and a cover nut 37. The tank 35 has a rearward extension 38 and said tank and its extension have a flat bottom wall and a convex upper

wall, said walls imparting a finished effect to the top of the radiator.

The flat bottom wall of the tank extension 38 has an opening 39 communicating with a top tank connection 40, which is suitably secured to the tank extension 38 and to a cylinder head 41 mounted on the cylinder block 1 and communicating with the jacket 3 thereof.

At the juncture of the tank 35 and its extension 38 there is a central deflector 51 for the water or cooling agent, so that the water will be distributed toward the sides of the tank and radiator.

The rear end of the tank extension 38 provides a hood 42 for the forward end of a fuel tank 43, said tank being oval in cross section, as best shown in Fig. 4, and suspended in the hood by a strap 44 having its ends held by the hood, as at 45. A suitable packing 46, as felt, is interposed between the front of the fuel tank 43 and the hood 42.

The top tank connection 40 has a depending bracket or bearing 47 supporting a shaft 48 for the fan 34, said fan shaft having a pulley 49 for a belt 50 that extends into the well 13 and is trained under the pulley 14 therein.

From the foregoing it will be observed that the construction affords a thermo-syphon cooling system and the circulation of the water or cooling agent has been indicated in Fig. 1 by arrows. The system acts on the principle that hot water seeks a higher level than cold water; consequently, when the water reaches a certain heat, approximately 180 Fahrenheit, circulation commences and water flows from the bottom of the radiator tank 28 through the connections 18 and 19, up through the water jacket 3, through the connection 40 into the top radiator tank 35, and down through the radiator core to the lower radiator tank 28, to repeat the process. Considerable importance is attached to the fact that the cooling system is maintained through a few rigid connections, in contradistinction to hose or flexible connections, and that the rigid connections constitute supporting members which permit of the engine and the radiator assembly as above described. The assembly is such as to be compact and permit of this part of the tractor being expeditiously assembled with full assurance that the elements entering into the construction will stand the vibrations and rough usage to which the same are subjected during operations of the tractor particularly on rough and irregular soil.

The engine and radiator assembly also lends a distinct appearance to the forward end of my tractor whereby it may be readily distinguished from other makes of tractor, and this is especially noticeable about the top radiator tank, since said tank, its extension and the fuel tank are all in alinement and have the appearance of a single structure forming a roof or canopy over the power plant of the tractor.

What I claim is:—

1. In an engine and radiator assembly, a cylinder block, a front cover connected thereto, and a radiator supported wholly on said cover and communicating with said cylinder block.

2. In an engine and radiator assembly for a tractor, a cylinder block, a front cover connected thereto, a bottom tank on said cover, a radiator on said tank, a top tank on said radiator and rigid connections establishing communication between said tank, radiator and cylinder block.

3. An engine and radiator assembly for tractors as characterized in claim 2 in which the top tank and one of said connections cooperate in supporting the forward end of the fuel tank for the tractor.

4. An engine and radiator assembly for tractors as characterized in claim 1, in which the front cover is adapted for connection with a front axle and affords a pulley well and a commutator support.

5. An engine and radiator assembly for tractors as characterized in claim 1 in which the front cover provides a cylinder block and radiator connection.

6. An engine and radiator assembly for tractors as characterized in claim 1 in which the front cover provides a pulley well and starter shaft bearing.

7. In an engine and radiator assembly for a tractor, the combination of an engine, and a radiator supported wholly from the top and bottom of the engine.

8. In an engine and radiator assembly, for a tractor, the combination of an engine, a fuel tank above said engine, a radiator in front of said engine, and means connecting the top of said radiator to said engine and supporting the forward end of said fuel tank.

9. In an engine and radiator assembly for a tractor, the combination of an engine, a front cover therefor, a bottom tank on said cover, a connection forming part of said cover adapted to establish communication between said tank and said engine, and a top tank on said radiator having a rigid connection establishing communication between said engine and said radiator.

10. In an engine and radiator assembly for tractor, the combination of an engine, a front cover therefor, a bottom tank on said cover, a connection forming part of said cover adapted to establish communication between said tank and said engine, a top tank on said radiator having a rear extension, a rigid connection between said engine and the rear extension of said tank, a rotary

fan supported from said rigid connection, and power transmitting means extending from said fan in said front cover.

11. In an engine and radiator assembly, an engine, a front cover therefor, a radiator on said cover, a fan in the rear of said radiator, and power transmitting means for said fan adapted to be driven from within said front cover.

12. In a tractor, the combination of an engine, a radiator in front of said engine, a top tank for said radiator, and a fuel tank above said engine as a canopy therefor and having its forward end held by said top tank.

13. In a tractor, the combination of an engine, a radiator in front of said engine, a top tank for said radiator, having a rear extension supported from said engine, and a fuel tank above said engine having its walls in alinement with the walls of said tank and the extension thereof.

14. In a tractor, the combination of an engine, a radiator in front of said engine, a top tank for said radiator, having a rear extension supported from said engine, and communicating therewith, and a deflector in the rear extension of said tank adapted to deflect a cooling agent to the sides of said tank.

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

HENRY FORD.

Witnesses:
CHAS. E. SORENSEN,
ERNEST KANDER.