F. B. UPTON AND W. C. KIRK.

WATER CIRCULATOR FOR WATER COOLED ENGINES.

APPLICATION FILED JAN. 17, 1918. RENEWED NOV. 28, 1921.

1,428,722. Patented Sept. 12, 1922.

Fig. 1.

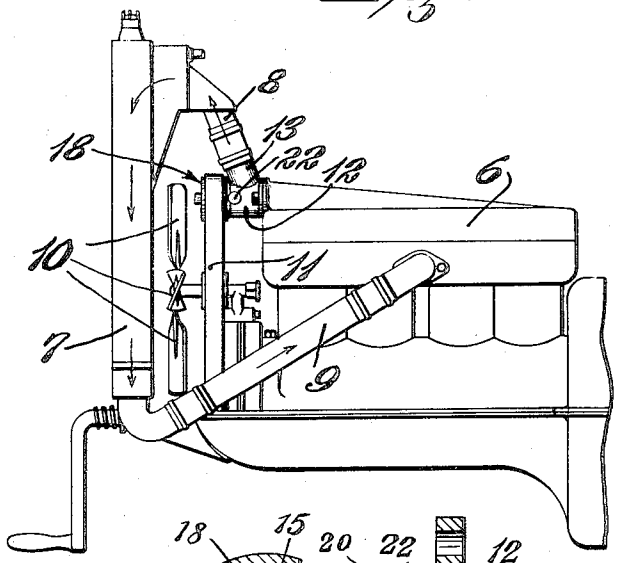


Fig. 6.

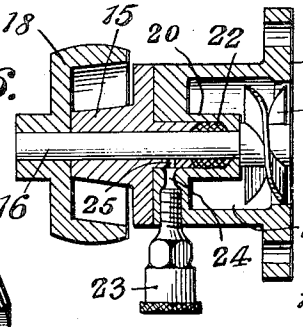


Fig. 2.

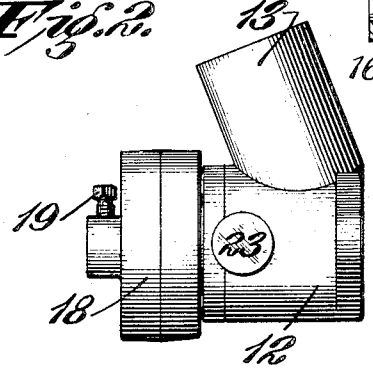


Fig. 3.

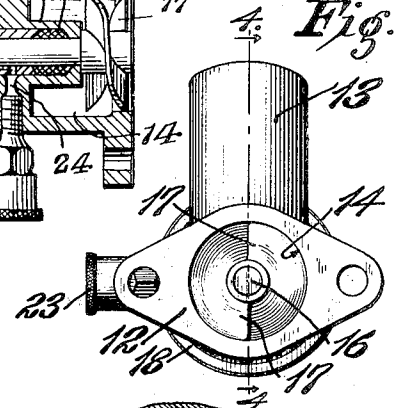


Fig. 4.

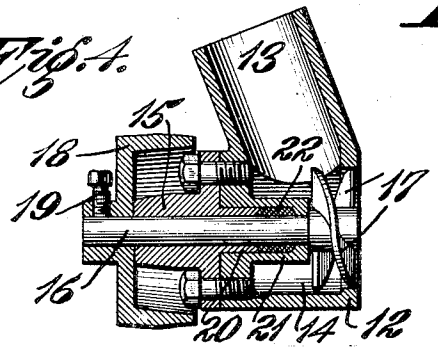
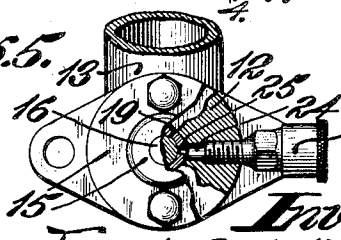


Fig. 5.



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UNITED STATES PATENT OFFICE.

FRANK BENJAMIN UPTON AND WILLIAM CLARK KIRK, OF CHATTANOOGA, TENNESSEE, ASSIGNORS TO PATTEN MANUFACTURING COMPANY, OF CHATTANOOGA, TENNESSEE, A CORPORATION OF TENNESSEE.

WATER CIRCULATOR FOR WATER-COOLED ENGINES.

Application filed January 17, 1918, Serial No. 212,200. Renewed November 28, 1921. Serial No. 518,427.

To all whom it may concern:

Be it known that we, FRANK B. UPTON, a citizen of the United States, and a resident of the city of Chattanooga, in the county of Hamilton and State of Tennessee, and WILLIAM C. KIRK, a citizen of the United States, and a resident of the city of Chattanooga, in the county of Hamilton and State of Tennessee, have invented a new and useful Improvement in Water Circulators for Water-Cooled Engines, of which the following is a specification.

Our invention relates to water cooling systems for internal combustion engines and has for its principal object to provide a device which will effect positive circulation of the water through the water jackets of the engine and the radiator. Another object of the invention is to provide a circulator, which can be secured in place by unskilled persons without difficulty. A further object is to overcome the disadvantages of the thermo-syphon system by providing a device which can be included in the ordinary thermo-syphon cooling system without greatly changing its construction, thus producing a positive circulation of the water. A further object is to provide a circulator which will be simple in construction and can be cheaply manufactured.

The invention consists in a circulator for a water cooled system adapted to be secured to the outlet of the engine. The invention also consists in a device for a water cooled engine operatively connected thereto and adapted to be secured to the water outlet of the engine for promoting the positive circulation of the water between the engine and the radiator. The invention also consists in the combination and arrangements of parts hereinafter described and claimed.

In the accompanying drawings, wherein like reference numerals refer to like parts wherever they occur,

Fig. 1 is a side elevation of an internal combustion engine with a water cooling system showing a water circulator embodying our invention;

Fig. 2 is a side view of the water circulator detached;

Fig. 3 is a view of the circulator looking at the end which communicates with the water outlet of the cylinder head;

Fig. 4 is a vertical longitudinal section on the line 4—4 in Fig. 3; and

Fig. 5 is an end view of the circulator with the pulley removed, parts being broken away to disclose the method of oiling.

Figure 6 is a horizontal sectional view passing through the axis of the shaft 16 in Figure 3.

Referring to Fig. 1 of the drawings, the gasoline engine 6 is shown in connection with the ordinary type of thermo-syphon cooling system. This system comprises a radiator 7 located in front of the engine and connected to the water jackets of the engine by a radiator inlet pipe 8 leading from the outlet end of the water jackets of the engine 6 to the upper portion of the radiator 7, and also connected to said jackets by a radiator outlet pipe 9 leading from the bottom of the radiator to the inlet side of the water jackets of the engine. The water in the radiator 7 is cooled by the usual rotary fan 10 which is driven from the crank shaft by a belt 11. The positive circulation of the water between the radiator and the water jackets of the engine is effected by means of a circulator or pump. The circulator consists in a hollow body portion 12 bolted or otherwise secured to the engine which is provided with a cylindrical chamber 14 communicating with the water outlet opening in the cylinder head of the engine.

An inclined branch pipe 13 leading from the chamber 14 is connected to the radiator inlet pipe 8 which leads to the top portion of the radiator 7. Rotatably mounted in a bearing member 15 bolted to the circulator is a shaft 16 which projects into the chamber 14 of the circulator and is provided with a screw propeller 17 at its end. This screw propeller is arranged adjacent the open end of the chamber 14 of the circulator and when rotated forces the water to circulate freely between the radiator and the water jackets of the engine. The propeller 17 is rotated from the crank shaft of the engine by means of the fan belt 11, which is lengthened out so as to operate a pulley 18 mounted on the end of this shaft 16. The pulley 18 is removably secured to the shaft 16 by means of a set-screw 19 and is driven from the fan belt 11, which is lengthened out to pass over the pulley 18 for operating the same.

The bearing 15 for the shaft 16 is provided with a packing gland 20, which projects in a stuffing box formed in the inwardly projecting portion 21 for holding the packing 22 located therein in position. An oil cup 23 is threaded into an oil hole 24 bored in the side of the circulator at its end and registers with a hole 25 in the packing gland 20 of the bearing 15 for oiling the shaft 16. The positioning of the packing 22 between the bearing for the propeller shaft and the water chamber of the circulator prevents the water from coming in contact with the bearing, thus resulting in a smooth running-water tight bearing that permits oiling.

One of the advantages of locating the circulator at the outlet end of the water jackets is that it permits the radiator fan belt to be used for operating the circulator pulley without disturbing the fan, radiator or any of its connections. This arrangement also permits the fan pulley to be used as a belt tightener.

The cooling arrangement described in the foregoing specification is considered only as an example and as being the one most generally used, but the invention is not restricted thereto, the circulator being equally as well applicable to various types of water cooling systems for internal combustion engines.

We claim the following as our invention.

1. In combination with the water cooling system of an internal combustion engine, a circulating unit detachably secured to the water outlet of said engine, said unit comprising a hollow elbow-shaped shell having a water chamber therein and inlet and outlet openings for said chamber, a bearing member secured to said shell, a shaft carried by said bearing member and extending into the wall of said chamber, a screw propeller secured to the end of the shaft within the chamber, a driving pulley secured to the other end of said shaft, means for lubricating the shaft bearing, a stuffing box formed by said bearing member and the shell, packing within said box, said stuffing box being adjacent to said water chamber whereby water is prevented from entering said bearing and washing away the oil therefrom.

2. In combination with the water cooling system of an internal combustion engine, a circulating unit detachably secured to the water outlet of the engine, said unit comprising a hollow elbow-shaped shell having a water chamber therein and inlet and outlet openings for said chamber, a bearing member secured to said shell, a shaft carried by said bearing member, and extending into the wall of said chamber, the axis of said shaft being substantially an extension of the axis of said inlet opening, a screw propeller secured to the end of the shaft nearest said opening, a driving pulley secured to the other end of said shaft, an oil cup mounted on the shell and having an opening through said shell to said shaft bearing, a stuffing box formed by said bearing member and the shell and adjacent the water chamber on one side and the oil connection on the other, whereby water from the chamber is prevented from contacting with said bearing and washing away the oil therefrom.

3. In combination with the water cooling system of an internal combustion engine, a circulating unit, detachably secured to the water outlet of said engine, said unit comprising a hollow elbow-shaped shell having a water chamber therein and inlet and outlet openings for said chamber, a substantially cylindrical member forming an integral part of said shell and extending into the water chamber to a point adjacent an opening of said chamber, a bearing member secured to said shell, and extending into the cylindrical member, a shaft carried by the bearing of said bearing member, a screw propeller secured to the end of the shaft nearest said opening, a driving pulley secured to the other end of said shaft, means for lubricating said shaft bearing, a stuffing box formed by said bearing member and the cylindrical portion of said shell packing within said stuffing box, said stuffing box being adjacent to said water chamber whereby water is prevented from coming in contact with said bearing and washing away the oil therefrom.

Signed at Chattanooga, Tennessee, this 10th day of January, 1918.

FRANK BENJAMIN UPTON.
WILLIAM CLARK KIRK.