J. P. CLULEY.

CIRCULATOR.

APPLICATION FILED MAY 20, 1918.

1,310,324.

Patented July 15, 1919.

Fig. 1

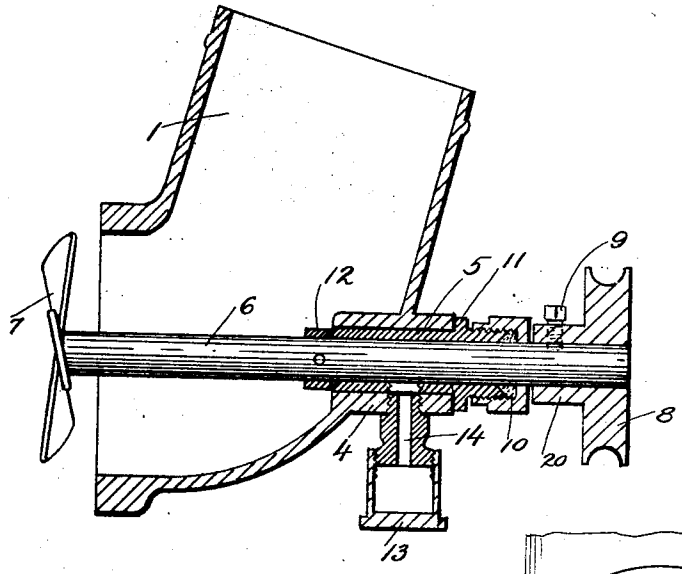


Fig. 3.

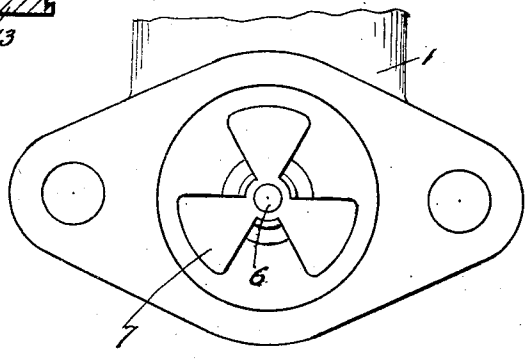
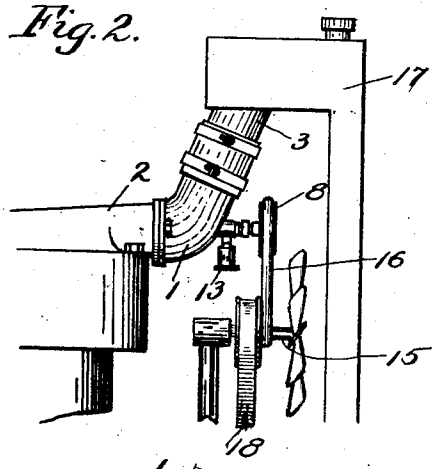


Fig. 2.



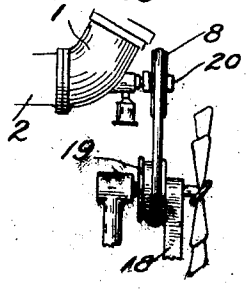


Fig. 4.

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UNITED STATES PATENT OFFICE.

JOHN P. CLULEY, OF CHICAGO, ILLINOIS.

CIRCULATOR.

1,310,324. Specification of Letters Patent. Patented July 15, 1919.

Application filed May 20, 1918. Serial No. 235,731.

To all whom it may concern:

Be it known that I, JOHN P. CLULEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Circulators, of which the following is a full, clear, concise, and exact description.

This invention relates to improvements in circulators and more particularly to devices of this character which are adapted primarily for use in connection with the cooling systems of automobile power plants.

As is well known, the ordinary thermo-siphon cooling system, such as is extensively used in connection with automobiles at the present time, is not effective in maintaining the engine at a proper temperature under all conditions of service, owing particularly to the fact that the cooling medium circulates through the system very slowly and hence heats up rapidly, and further owing to the fact that all circulation in the system ceases upon a drop in the level of the cooling medium to a point below the radiator inlet. Broadly two classes of devices have been designed to overcome these defects by producing a forced circulation of the cooling medium, one class of said devices utilizing exhaust gases of the engine for this purpose, while the other class thereof makes use of a mechanical impelling device. The present invention relates to a device of the second class.

Heretofore, these impelling devices of the second class, have been mounted at or near the bottom of the system either in the water jacket inlet or in the connection between said inlet and the radiator. While circulators so mounted operate effectively to produce the desired circulation of the cooling medium during the period said medium remains at a high level, they fail to produce any circulation thereof through the radiator when the level of said medium drops slightly to a point below the mouth of the radiator inlet. This is due largely to the fact that the impelling force of the circulator on the cooling liquid is spent before it reaches said inlet and hence the necessary power to lift the water into the radiator is lacking.

One object of the present invention, therefore, is to provide a circulator or impelling device of the type described which shall be adapted for insertion in the cooling system at the top of the engine water jacket in order that the lifting power of said device will be concentrated at a point in close proximity to the radiator inlet whereby the cooling medium will be forced through said inlet into the radiator regardless of slight variations in the level of said medium which would otherwise cause the circulation thereof to stop.

Another object of the invention is to mount the circulator in the wall of a pipe coupling designed to replace the ordinary elbow coupling which connects the water jacket outlet with the radiator inlet in such manner that said circulator, when positioned, will extend slightly into said outlet.

A further object is to provide a circulator which may be readily and quickly applied to and removed from the ordinary upper radiator coupling flange of a Ford engine and one which is readily accessible for purposes of repair, etc.

Other objects and advantages will be apparent from the following description taken in connection with the accompanying drawings wherein the preferred embodiment of the invention is illustrated.

Figure 1 is a vertical sectional view taken through an elbow coupling showing the circulator mounted on the wall thereof.

Fig. 2 is a side elevation showing the device applied to the ordinary thermo-siphon cooling system.

Fig. 3 is a front elevation of the coupling showing the circulator mounted therein, and

Fig. 4 is a view similar to Fig. 2 showing the driven pulley of the circulator reversed on its shaft so that it may be driven directly from the fan belt pulley which is a desirous arrangement in the event the power plant of the vehicle is provided with a self-starter.

Referring more in detail to the drawings, 1 designates a flanged elbow coupling preferably of cast metal designed to replace the ordinary elbow coupling provided in a thermo-siphon system as a connection between the water jacket outlet 2 and the radiator inlet 3. This casting 1 is provided with a suitable journal bearing 4 within which is mounted a bushing 5 preferably of brass, said bushing 5 serving as the bearing for the shaft 6 on one end of which is mounted an impelling element 7, while mounted on the other end thereof is a suitable pulley 8. The pulley 8 is preferably removably mounted on said shaft for the purpose hereinafter pointed out, the same

being held rigid therewith by means of a suitable set screw 9. A stuffing box 10 which may be of any desired construction is provided at the outer end of the bushing 5, substantially as shown, said bushing being also provided with an annular collar 11 designed to bear against the sleeve 4 in order to anchor said bushing against movement in one direction. A suitable collar 12 held rigid with the shaft 6 and designed to bear against the inner end of the bushing 5 prevents the shaft from moving outwardly while the pulley 8 prevents said shaft moving in the other direction. A suitable grease cup is shown at 13 and is preferably screw-threaded into the bearing 4, a suitable duct 14 being provided through which the grease from the cup 13 may be forced into contact with the shaft 6 in order to provide the necessary lubrication therefor. It is preferred to have the shaft 6 extend beyond the lower open end of the casting 1 so that the impelling element 7 may be readily applied thereto after the shaft has been positioned and further in order that said element may be readily reached for purposes of repair. This arrangement also permits the impelling element to extend slightly into the water jacket outlet 2 when the device is mounted in its operative position as shown in Fig. 2.

Referring further to Fig. 2, it will be noted that when the coupling 1 is placed in position, the shaft 6 of the circulator extends forwardly therefrom preferably parallel to the fan shaft 15 and in substantially close proximity thereto, the pulley 8 of the circulator being adapted to be driven from said shaft 15 by means of a suitable belt 16. It will be noted from this arrangement that the lifting power of the impelling element 7 is concentrated at a point in close proximity to the radiator inlet 3 and that accordingly the cooling medium of the system will be raised or forced into the radiator 17 even though the level of said cooling medium falls to a point slightly below the upper end of said inlet. This continued circulation of the cooling medium after the level thereof has fallen slightly is not effected by the use of a circulator at or near the bottom of the system, as previously pointed out.

As is well known, the application of an electric starter to an automobile engine of the type herein referred to necessitates a movement of the fan belt 18 forward of its normal position to a position substantially as shown in Fig. 4. This renders the pulley 19, over which the belt 18 originally passed, useless as far as the operation of the fan is concerned. Furthermore, when a power plant is encountered which is provided with a self starter the fan belt 18 is directly beneath the pulley 8 of the circulator when said pulley is in the position shown in Fig. 2. For obvious reasons, therefore, it would be difficult to derive power from the fan shaft 15 for the purpose of driving the circulator when an arrangement of this character is encountered. To overcome this disadvantage, the pulley 8 on the circulator shaft 6 may be removed, as above set out and again applied thereto in its reversed position, substantially as shown in Fig. 4, in which position it will be noted that said belt will be in substantial alinement with the otherwise useless fan pulley 19 from which said pulley 8 may be driven. The elongated hub 20, which is provided on one side only of the pulley 8 renders the reversal of said pulley effective in positioning the same in one or the other of its plurality of positions. The set screw 9, as above set out, may be used in making the pulley fast with the shaft 6.

It is not intended to restrict the present invention to the detailed construction or combination parts herein illustrated and described except where limitations appear in the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:—

1. The combination with the fan shaft and cooling system of an internal combustion engine, said cooling system comprising a water jacket, radiator and connections therebetween, of a shaft journaled in the wall of the connection between said water jacket and the top of the radiator, and above said fan shaft a fluid impelling device mounted on the inner end of said shaft, a pulley on the opposite end thereof, a belt for driving said pulley from said fan shaft, and means whereby a reversal of said pulley on its shaft shifts the driving engagement of said belt with the fan shaft.

2. As a new article of manufacture, a coupling to be substituted between the water jacket and radiator reservoir of a Ford car comprising an elbow having its inlet end arranged horizontally and provided with vertical flanges to be secured to the vertical flanges at the water jacket outlet, a propeller shaft arranged horizontally and passing through the wall of said coupling with its axis of rotation coinciding with the center of said inlet end, a propeller on the inner end of said shaft, and means on the outer end of said shaft for rotating the latter to lift the water from said water jacket into said reservoir.

In witness whereof, I, hereunto subscribe my name this 11th day of May A. D., 1918.

JOHN P. CLULEY.