A. B. MODINE.

TEMPERATURE CONTROLLING MECHANISM FOR INTERNAL COMBUSTION ENGINES.

APPLICATION FILED DEC. 29, 1919.

1,433,399. Patented Oct. 24, 1922.

Fig. 1

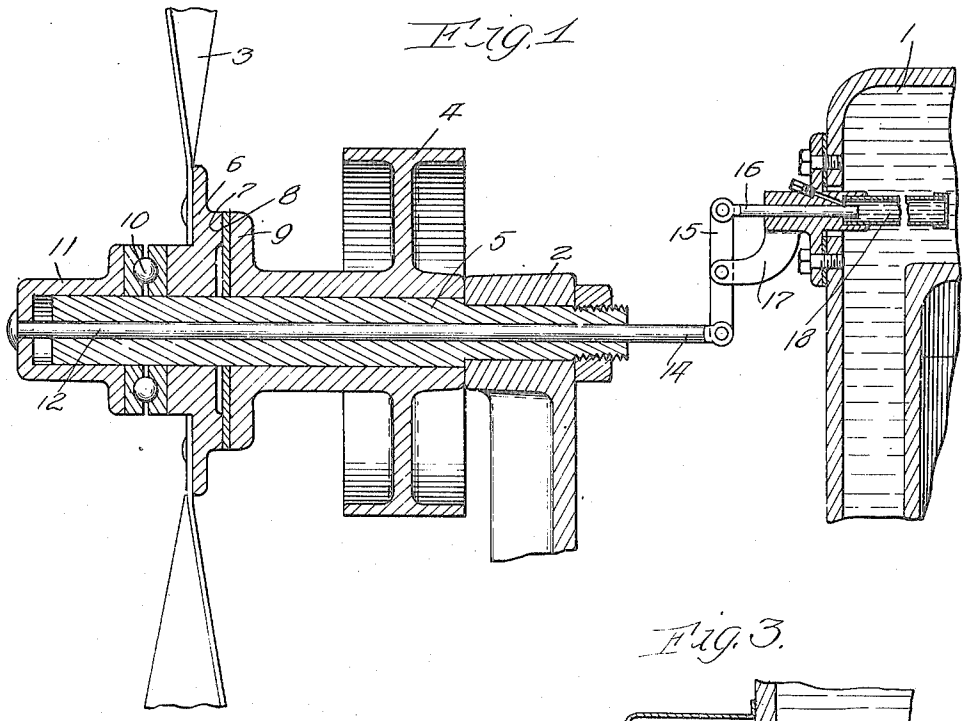


Fig. 3.

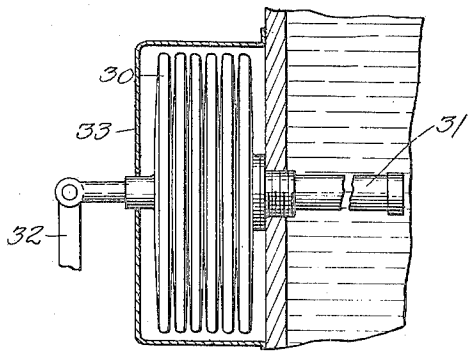
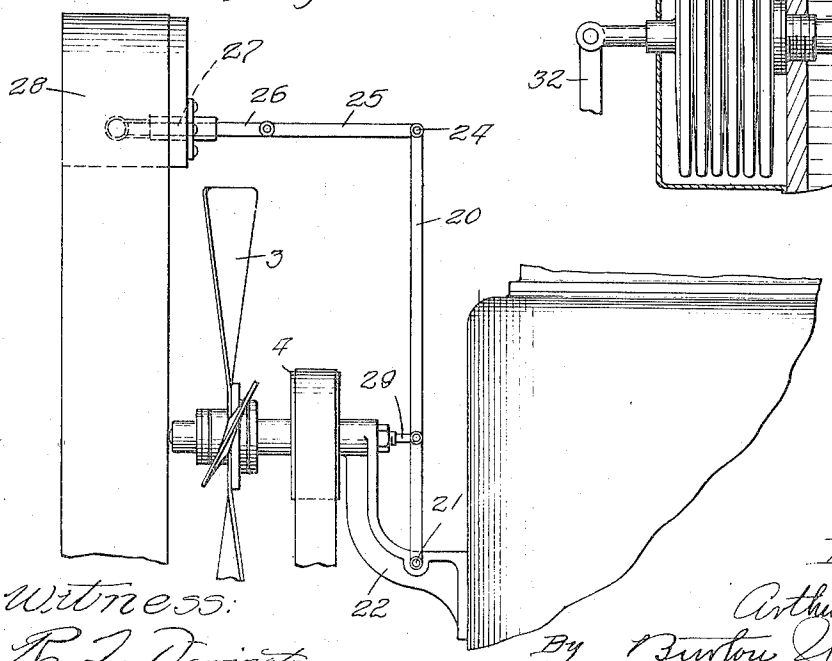


Fig. 2



Witness:
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Inventor,
Arthur B. Modine
By Burton L. Wills
Abby.

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UNITED STATES PATENT OFFICE.

ARTHUR B. MODINE, OF RACINE, WISCONSIN.

TEMPERATURE CONTROLLING MECHANISM FOR INTERNAL-COMBUSTION ENGINES.

Application filed December 29, 1919. Serial No. 348,244.

To all whom it may concern:

Be it known that I, ARTHUR B. MODINE, a citizen of the United States, residing at Racine, in the county of Racine and State of Wisconsin, have invented certain new and useful Improvements in a Temperature Controlling Mechanism for Internal Combustion Engines.

My invention relates to means for controlling the velocity of the cooling fluid passing through the radiator of an internal combustion engine whereby the temperature of the radiator is maintained within normal limits. The object of my invention is to produce a simple, reliable and highly efficient device of the kind described whereby the velocity of the cooling medium through the radiator is increased to correspond with any increase in the temperature of the circulating liquid.

To this end my invention consists in the novel construction, arrangement and combination of parts herein shown and described and more particularly pointed out in the claim.

In the accompanying drawings wherein like or similar reference characters indicate like or corresponding parts:

Fig. 1 is a central longitudinal section of my improved controlling mechanism and the associated parts of an internal combustion engine.

Fig. 2 is an elevation of a slightly modified form of my device.

Fig. 3 is a detail of a slightly modified form of a controlling motor for my device.

In the form shown in Fig. 1 of the drawings, 1 is a portion of the water jacket of an internal combustion engine; 2 is a bracket for supporting the fan 3 for controlling the velocity of the cooling medium through the radiator and 4 is the member for rotating the fan which is in the form shown comprises a belt-pulley rotatably mounted upon the stud 5 which is in turn rigidly attached to the bracket 2. The fan 3 is provided with a hub 6 rotatably mounted upon the stud 5 and provided with an annular friction face 7 adjacent the pulley 4 adapted to co-operate with a friction face 8 formed of fiber or other suitable material attached to the hub 9 of the pulley 4; the opposite end of the hub 6 is provided with an anti-friction bearing 10 of any suitable form or construction adapted to co-operate with the cap 11 at the outer end of the stud 5 for controlling the position of the hub upon the stud. The cap 11 is movable longitudinally of the stud 5 and a rod 12 is attached to the cap and extends longitudinally through the stud with a part 14 extending at the opposite end thereof and connected by a link 15 to a plunger 16, the link 15 being pivotally mounted intermediate its end upon the bracket 17 attached to the water jacket of the engine. A liquid tight chamber 18 is positioned within the water jacket 1 surrounded by the circulating medium in the water jacket and the chamber 18 is sufficiently filled with a suitable liquid to control the position of the plunger 16. The several parts are so constructed and arranged and the chamber 18 is provided with sufficient liquid to operate the several parts to permit the pulley 4 to freely rotate upon the stud without rotating the hub 6 and fan 3. As the temperature of the circulating medium in the jacket increases however the temperature of the fluid in the chamber 18 will also increase thereby expanding the liquid and forcing the plunger 16 outward thus drawing the cap 11 toward the pulley 4 and forcing the friction face 7 of the fan against the friction surface 8 of the pulley thus causing the fan 3 to operate thereby increasing the velocity of the cooling medium through the radiator. As the temperature increases the speed of the fan will obviously also increase until it reaches the full speed of the pulley 4 or the maximum speed intended for the fan.

In the form shown in Fig. 2 the several parts are constructed substantially the same as shown in Fig. 1 except that the link 20 is pivotally attached at one end as at 21 to the bracket 22 and at the opposite end 24 is connected by a link 25 to a plunger 26 cooperating with a liquid chamber 27 substantially the same as that shown in Fig. 1 except that in this form the chamber 27 is positioned in the upper reservoir 28 of the radiator and the rod 29 corresponding to the rod 14 in the form shown in Fig. 1 is pivotally attached to the link 20 at its lower end. as shown. Where for any reason an extremely sensitive device is desired, or for any other reason, the plunger 16 is shown in Fig. 1, or 26 shown in Fig. 2, is objectionable, the same may be varied. For example a diaphragm mechanism 30 such as shown in Fig. 3 may be employed and rigidly secured to the outer wall of the jacket 1 with the

inner end connected to the expansion chamber 31 corresponding to the chambers 18 and 27 in Figs. 1 and 2 respectively and with its opposite side pivotally connected to the link 32 as shown. Where it is desired to position the bellows diaphragm 30 at the exterior of the water jacket and exposed to a current of air or other disturbing influence, a shield or hood 33 may be provided to enclose the diaphragm 30 to protect the same or if preferred, the bellows diaphragm may be positioned within the water jacket or in any other portion of the circulating system.

Having thus described my improvement it is obvious that various immaterial modifications may be made in my device without departing from the spirit of my invention, hence I do not wish to be understood as limiting myself to the exact form or construction shown.

What I claim as new and desire to secure by Letters Patent is:

In a device of the kind described, a radiator adapted to contain a circulating liquid and permitting the passage of a cooling fluid therethrough, in combination with a fan for producing a flow of said cooling liquid through the radiator, a hollow driving shaft for operating said fan, said fan being rotatably and slidably mounted on said shaft, driven means rotatably and slidably mounted on said shaft, a friction member between said driven means and said fan for drivingly connecting said fan and driven means to said shaft, means slidable through said hollow shaft and causing said fan and driven parts to be slid on said shaft relative to one another whereby the amount of slip between said fan and driven parts is varied, and thermostatic means automatically controlled by the temperature of the liquid whereby said last mentioned means is caused to be slid through said hollow shaft.

In testimony whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

ARTHUR B. MODINE.

Witnesses:
BLANCHE CHALMERS,
BURTON U. HILLS.