

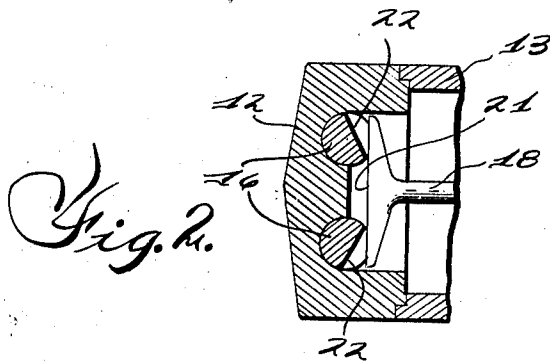
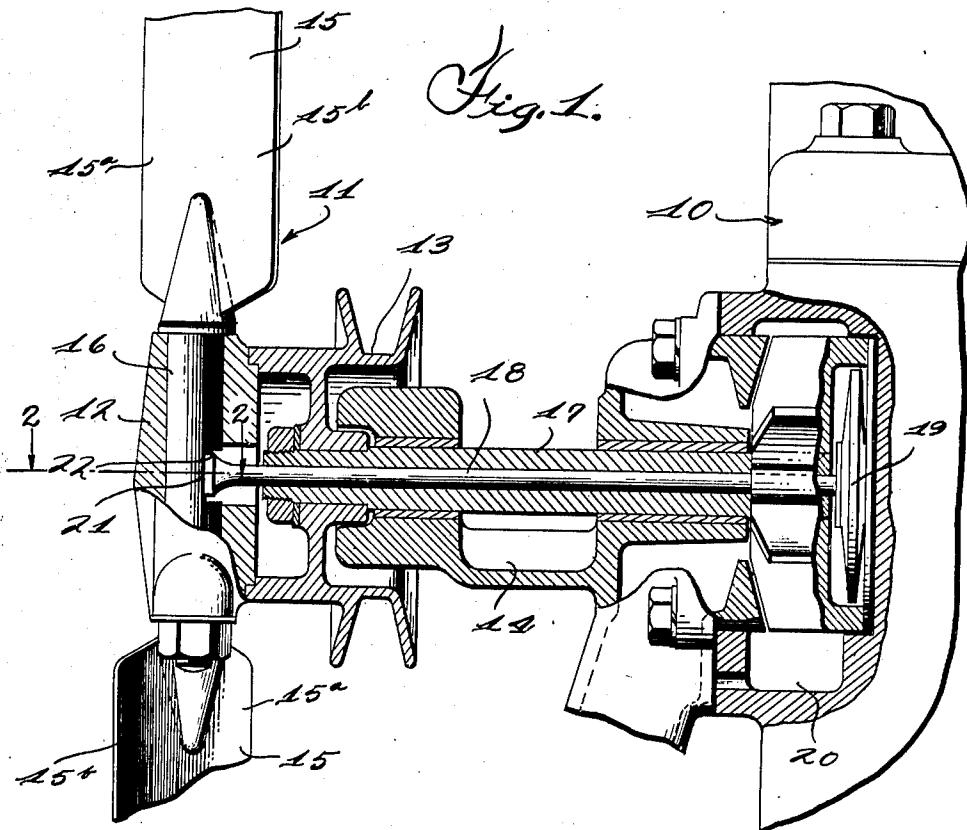
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1,978,788

THERMOSTATICALLY CONTROLLED FAN

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## UNITED STATES PATENT OFFICE

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## THERMOSTATICALLY CONTROLLED FAN

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2 Claims. (Cl. 170—163)

This invention relates to cooling systems for motor vehicles and the like and more particularly to a thermostatically controlled fan of the type usually employed in the cooling systems of internal combustion engines for motor vehicles.

In circulatory cooling systems for the engines of motor vehicles it is customary to provide a fan arranged between the motor and water cooling radiator for drawing air through the radiator to assist in the dissipation of the heat. However, it is also customary to provide shutters with various types of control mechanism whereby the passage of air through the radiator is cut off or checked, particularly in cold weather, until the motor temperature has reached a predetermined degree. However, with the use of shutter mechanisms with radiators it is still generally customary to drive the fan and have the fan exert its maximum effort to draw air through the radiator. This is inefficient because the action of the fan tends to counteract the control which the shutters afford for the passage of air through the radiator.

It is therefore one of the important objects of this invention to provide a thermostatically controlled fan, the blades of which may be rotated to feather the blades so that when the motor is cold the angle of the blades of the fan will be such that little if any air will be drawn through the radiator, provision being made for feathering the blades in the opposite direction as the motor temperature increases so that when the temperature has reached a predetermined point the fan blades will be feathered so as to exert the maximum effort.

The several objects, advantages and novel details of construction of the invention will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawing, wherein

Figure 1 is a fragmentary sectional elevational view through a motor vehicle engine showing a cooling fan associated therewith constructed in accordance with my invention, and

Figure 2 is an enlarged fragmentary sectional view taken substantially on the plane indicated by line 2—2 in Figure 1.

Referring now to the drawing wherein like reference characters indicate like parts, there is illustrated a fragment of a motor vehicle engine 10 on the forward end of which a cooling fan indicated generally by the reference character 11 is mounted. To the hub 12 of the fan there is attached a pulley 13 with which the ordinary fan belt (not shown) engages for rotating the

fan. The fan is rotatably journaled on a bracket 14 projecting from the front of the engine 10.

As shown, the hub 12 of the fan is fashioned with a pair of parallel openings for rotatably receiving the shafts 16 which carry the fan blades 15 and the shafts are secured therein by means of bolts. Each fan blade 15 is unbalanced with respect to its shaft 16. In other words, the shaft 16 of each fan blade is offset from the longitudinal center of the fan blade to provide a relatively narrow portion 15<sup>a</sup> arranged on one side of the longitudinal center of the fan and a relatively wide portion 15<sup>b</sup> arranged on the other side of the longitudinal center of the fan blade. The shaft 16 of each fan blade is normally free to rotate in the hub 12 so that by reason of the unbalanced condition of each fan blade, the wider section 15<sup>b</sup> drags or trails when the fan is rotated to thus so feather the blades that rotation of the fan will not cause air to be drawn through the radiator. This is the position of the fan blades when the motor is started and when the temperature thereof is below a predetermined point.

Extending through the shaft 17 of the fan is a rod 18 the rear end of which is adapted to be engaged by a thermostatic element 19. This thermostatic element may be of any preferred or desired design and is preferably responsive to temperature changes in the motor 10. For this purpose it may be conveniently located within or in juxtaposition to a water passage 20 of the circulatory cooling system of the motor. As the temperature rises in the motor the thermostatic element 19 expands and exerts an endwise pressure on the rod 18 which will slide the same longitudinally of the shaft 17 and cause the flattened end 21 thereof to engage against the corners of flattened surfaces 22 on the blade shafts 16. This pressure of the rod 18 on the blade shafts 16 causes a rotative movement thereof so as to bring the flattened surfaces 22 into surface engagement with the flattened end 21 of the rod 18. This rotative movement of the blade shafts 16 causes a rotative movement of the blades to feather the blades and cause them to assume substantially the position illustrated in Figure 1 in which they will cause air to be drawn through the radiator of the motor vehicle. Obviously, as the temperature of the motor increases the blades will be feathered from the position in which they are rotated flatwise to the completely feathered position in Figure 1. When in this latter position the fan will obviously exert its maximum action and will cause a maximum amount of air to be drawn through the radiator.

It is obvious that if the motor is started in a cool condition and the fan blades are rotated flatwise so that no air is drawn through the radiator by the fan that the motor will heat up more quickly and thus more quickly attain the desired temperature. As the motor attains this desired temperature, the feathering action heretofore referred to will take place so that the fan will become effective to cool the radiator and as a consequence the motor and to maintain the motor at this desired temperature.

Obvious modifications will suggest themselves to those skilled in this art and to this end reservation is made to make such changes as may come within the purview of the accompanying claims.

What I claim as my invention is:

1. A motor vehicle cooling fan comprising a hub, a fan blade shaft rotatively mounted in said hub, a blade carried by said shaft and attached thereto at one side of its longitudinal center

whereby said blade is unbalanced, said shaft having an angular portion providing a corner, a temperature responsive means, a rod slidable endwise upon expansion of the temperature responsive means, and means on said rod engageable with said corner to rotate said blade shaft, for the purpose set forth.

2. A motor vehicle cooling fan comprising a hub having a pair of parallel openings therein, fan blade shafts rotatively mounted in said openings, a fan carried by each of said shafts and attached thereto at one side of its longitudinal center whereby said blade is unbalanced, said shafts each having a flattened portion providing a corner, a temperature responsive means, a rod slidable endwise upon expansion of said temperature responsive means, and an end on said rod engageable with said corner to rotate said blade shaft, for the purpose set forth.

CLAUDE E. FURGASON.

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