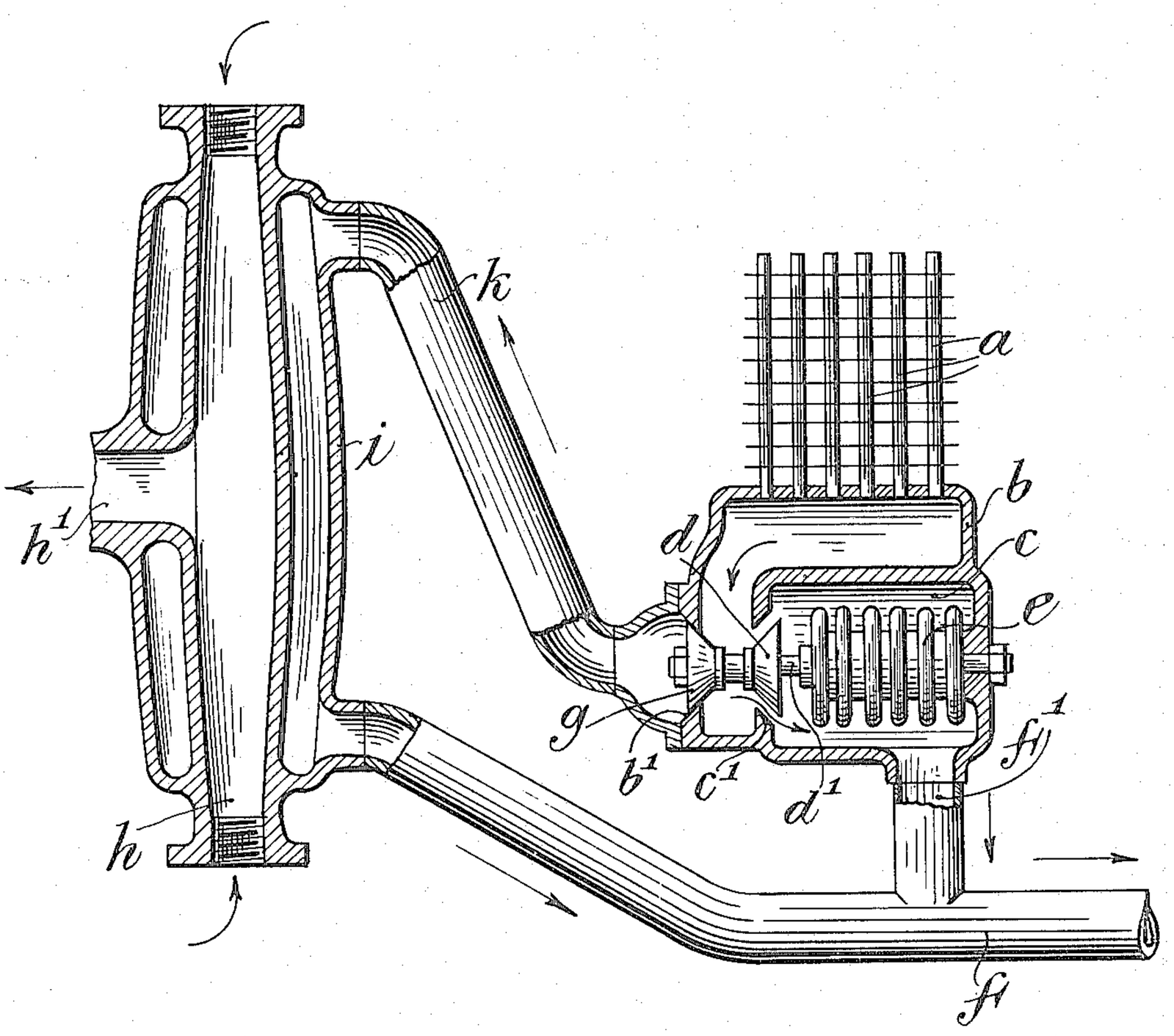
Nov. 18, 1924. 1,515,742

K. R. MANVILLE

AUTOMATICALLY CONTROLLED COOLING SYSTEM FOR INTERNAL COMBUSTION ENGINES

Filed May 10 1923



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Patented Nov. 18, 1924. 1,515,742

UNITED STATES PATENT OFFICE.

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AUTOMATICALLY-CONTROLLED COOLING SYSTEM FOR INTERNAL-COMBUSTION ENGINES.

Application filed May 10, 1923. Serial No. 637,944.

To all whom it may concern:

Be it known that I, KEITH R. MANVILLE, a citizen of the United States, residing in the borough of Brooklyn, of the city of New York, in the State of New York, have invented certain new and useful Improvements in Automatically-Controlled Cooling Systems for Internal-Combustion Engines, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

In internal combustion engine practice it is usual to provide a cooling medium for the water which is intended to be adequate to cool the water at heavier loads. In such systems it has been thought undesirable to cool the water to such a degree at lighter loads and, accordingly, thermostatically controlled valves have been disposed in the circulatory system for the purpose of by-passing more or less of the water around the radiator so that it would not be subject to its cooling action. By the present invention it is sought to provide a cooling system in which the water is not cooled less but in which at heaviest loads the water may be cooled more. To this end, it is proposed to divert automatically more or less of the water from the radiator to a supplementary cooling medium before it flows onto the cylinder jackets. The invention is designed primarily with reference to its use in connection with engines which are at times heavily overloaded as is the case in fire pumpers. The preferred embodiment shows the auxiliary cooling medium as being the main intake pipe for the fire pumper through which water passes from the source of supply to the pump. The improved device is of simple construction and lends itself to introduction without great expense or alteration of the parts of a conventional circulatory system. Reference is now to be had to the accompanying drawing for an understanding of the invention which shows its application to the circulatory system of an engine employed in a fire pumper, parts being shown in elevation and parts in section and all of them in a more or less conventional manner.

As shown, the cooling coils *a* of a radiator of conventional design communicate with a housing *b* which receives water from the coils and this housing is formed with a subcompartment *c* in the wall of which is formed a port *c'* controlled by a valve *d*. In the subcompartment *c* is disposed a thermostat *e* of any approved construction which carries the stem *d'* of the valve *d* to control the position of the latter with respect to its seat in a manner which will be understood. From the subcompartment *c* communication is established with the return flow pipe *f* of the water circulatory system leading to the pump or to the cylinder jackets, by a connection *f'*. The housing *b* has formed in its outer wall a port *b'* which may be controlled by a valve *g* opposed to the valve *d* but carried on the same stem *d'* so that when one valve is seated the other valve is open. In accordance with the invention it is proposed that the water from the radiator *a* which is adequate for normal cooling shall flow past the valve *d'* and connection *f'* into the return flow pipe *f*, the valve *g* being seated meanwhile. Under heaviest loads of the motor, as in operating a fire pump it may be that the radiator *a* is not of adequate capacity to maintain the water at the most effective cooling temperature. In this situation it is proposed to pass the water from the radiator *a* through a supplementary cooling medium by which its temperature is further lowered before return flow through the pipe *f*. The invention in its broader aspects is not limited to the precise character of the supplementary cooling medium although where it is embodied in a fire pumper the water flowing to the pump may be availed of for such additional cooling. Such a construction is indicated in the drawing wherein the pipe *h* leads water from the source of supply through the outlet *h'* to the pump. Any desired extent of pipe *h* may be jacketed as indicated at *i* to receive water from the radiator *a* as through the pipe connection *k* when the valve *g* is unseated. From the jacket *i* the cooling water after having its temperature lowered somewhat by the water flowing through the pipe *h* may be returned to the pipe *f* of the circulatory system as will be clear.

It will now be appreciated that the principal result achieved by the invention is the additional cooling of the water of an engine when the latter is under unusual loads, the additional cooling being controlled automatically by a thermostat which diverts it through a cooling medium which supple-

ments a radiator which is normally adequate. The thermostat *e* disposed in the path of the cooling water will be influenced by its temperature so as to open the valve *g* to a greater or less extent when a predetermined maximum temperature has been reached so that more or less of the water will be diverted from the housing *b* through the jacket *i* for additional cooling before returning through the circulatory pipe *f*.

The drawing shows a conventional construction and is not to be taken as limiting but merely as illustrative of a satisfactory arrangement for practicing the invention. Changes in the character of any of the units and in the design and relationship thereof may be made without departing from the spirit of the invention.

What I claim is:

1. A circulatory water cooling system for internal combustion engines, in combination with a radiator of adequate capacity for normal conditions, a connection from said radiator to the return pipe of the circulatory system, a valve controlling said connection, a thermostat disposed in said connection and controlling said valve, a by-pass for water from the radiator to the return pipe of the circulatory system, a valve to control said by-pass, said valve being controlled by said thermostat, and a supplementary cooling means connected in said by-pass to receive the water for additional cooling at a predetermined maximum temperature.

2. In a water cooling circulatory system of an internal combustion engine, in combination with a radiator, a bottom header therefor formed with a subcompartment provided with a port through which the water passes from the header into the subcompartment, a thermostat supported in the subcompartment, a valve carried with the thermostat to control said port, a connection from the subcompartment to the return circulatory pipe, said header being formed with an outlet port, a valve to control the outlet port carried with said thermostat whereby one or the other of said valves is opened when the other is closed, and a supplementary cooling means connected with said last-named port and with the return circulatory pipe.

This specification signed this 8th day of May, A. D. 1923.

KEITH R. MANVILLE.