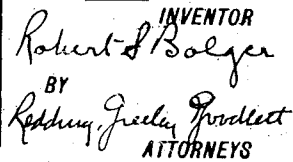


APPLICATION FILED MAY 13, 1918.

Patented June 15, 1920.



WITNESS
Loeschman.

UNITED STATES PATENT OFFICE.

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GENERATOR SET.

1,343,494.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ROBERT S. BOLGER, a citizen of the United States, and a resident of Richmond Hill, in the county of Queens of the State of New York, have invented certain new and useful Improvements in Generator Sets, of which the following is a specification, reference being had to the accompanying drawing, forming a part hereof.

This invention has been developed in connection with the designing of a mobile search-light, in which a generator set, constituting a structural unit, is to be mounted on a motor truck for convenient transportation from place to place. It is concerned mainly with the cooling of the motor of the generator set and to that extent is applicable generally to the cooling of internal combustion engines, but it involves also some features of construction and arrangement more closely related to the main purpose, namely, the production of a generator set for the particular purpose referred to. In the structure in which the invention is embodied, the motor, the cooling devices and the generator are mounted upon a common frame, so that they may be handled as a unit and, if desired, removed from the truck on which the unit is transported. Since the motor ordinarily is stationary when in use for search-light purposes, a large surface for the cooling water is desirable and to meet this requirement without making the single radiator unduly large, two radiators are provided, one at each end or side of the motor, each radiator being connected on one side to the common circulating pump and on the other side to the water jacket and provisions are made, as will be explained hereinafter, for the regulation of the flow of cooling water through each radiator and for the thorough mixing of the water drawn from each radiator and of the water returned from the water jacket to the two radiators so that the water shall be of one temperature throughout at any given point instead of having a portion delivered from one radiator to one part of the water jacket at one temperature and another portion delivered from the other radiator to another part of the water jacket at a different temperature. Other features of improvement will be called to attention hereinafter.

The single figure of the drawing is a view

in side elevation of a generator set which embodies the invention.

Frame members *a* serve to support and to unite in a structural unit the several members of the generator set including an internal combustion engine *b* of any desired type, a generator *c*, and two radiators *d*, *d*, of any suitable character, together with their connections. Water from the two radiators *d*, *d*, is delivered through suitable pipes *e*, *e*, to a suitable pump *f*, each pipe *e* being provided with a valve *e'* so that the flow of water from each radiator to the pump can be regulated independently. The pump, driven by any suitable means not necessary to be shown herein, delivers water through a single outlet pipe *g* and branches *g'* to the water jacket of the motor *b*, which is shown in the drawing as having its cylinders arranged in two blocks, although obviously, they might be arranged in a single block. The water, which is heated in its passage through the water jacket, is delivered through outlets *h'* to a common equalizing tank *h* which is supported suitably between the two radiators and is connected, at each end, through a suitable discharge pipe *h²*, with the corresponding radiator *d*. In setting up the complete structure the two pipes are extended more or less within the tank *h* so as to equalize or regulate as nearly as possible, through the varying frictional resistance due to a greater or less length of one pipe or the other, the flow from the tank to the several radiators, as may be required by structural conditions. When the apparatus is in use, the flow may be further regulated by the valves *e'* as may be required by conditions of use.

It is a usual condition in multicylinder motors for one cylinder to run hotter than another, consequently the water from the jackets varies in temperature accordingly. In the present construction it is sought to require of each radiator equal cooling capacity. Therefore, the streams of water from all jackets are thoroughly admixed in the tank to strike a mean temperature free from all currents before it is delivered to the two radiators. Accordingly, each radiator receives the same quantity of water as the other radiator and the water passing to one radiator is at the same temperature as the water passing to the other radiator. If the

thorough admixture of the streams of water from the jackets was not secured by discharging all of these streams into a tank from which the mass of water was later withdrawn through independent connections a thermo-siphon action would be set up. For instance, if the two streams of water of different temperatures coming from different jackets were discharged into a common pipe, it is quite evident that a thermo-siphon action would be set up and the circulation of water through one jacket would be faster than through another. This is the precise action which the present construction seeks to avoid.

It will be observed that each pipe connection includes a flexible section to minimize as far as possible the effect of vibration.

The armature shaft c' is directly coupled, through a suitable coupling, indicated at c^2 , to the motor shaft b' and on the coupling is mounted a bevel fan k, k' , for the purpose of effecting a good circulation of air about the generator and the motor to aid in the cooling of both.

As indicated in the drawing, a crank m for use in starting the motor, may be applied to the end of the armature shaft which is connected directly with the crank shaft b' of the motor.

With each radiator d, d , is provided the usual fan (not shown) mounted on a shaft n and driven by pulley n', n^2 and a cord n^3 from the crank shaft of the motor.

It will be understood that various changes in details of construction and arrangement

may be made to suit different conditions of use and that the invention is not limited to the precise construction shown and described herein except as set out in the accompanying claims.

I claim as my invention:

1. The combination with a multicylinder water-jacketed motor, of two independent radiators, means to deliver water from the radiators to the water jacket of the motor, an equalizing tank, connections to deliver water from the water jacket of each cylinder of the motor to the tank in which streams of water from the jackets of all cylinders are thoroughly admixed and their temperature equalized, a single circulating pump between the radiators and the water jacket and separate connections to deliver water from the tank to the radiators.

2. The combination with a multicylinder water-jacketed motor, of two independent radiators, means to deliver water from the radiators to the water jacket of the motor, an equalizing tank, connections from the water jacket of each cylinder of the motor to the tank in which streams of water from the jackets of all cylinders are thoroughly admixed and their temperature equalized, a single circulating pump between the radiators and the water jacket and separate connections from the tank to the radiators, each connection including an open-ended outlet pipe extended within the tank.

This specification signed this 10th day of May, A. D. 1918.

ROBERT S. BOLGER.