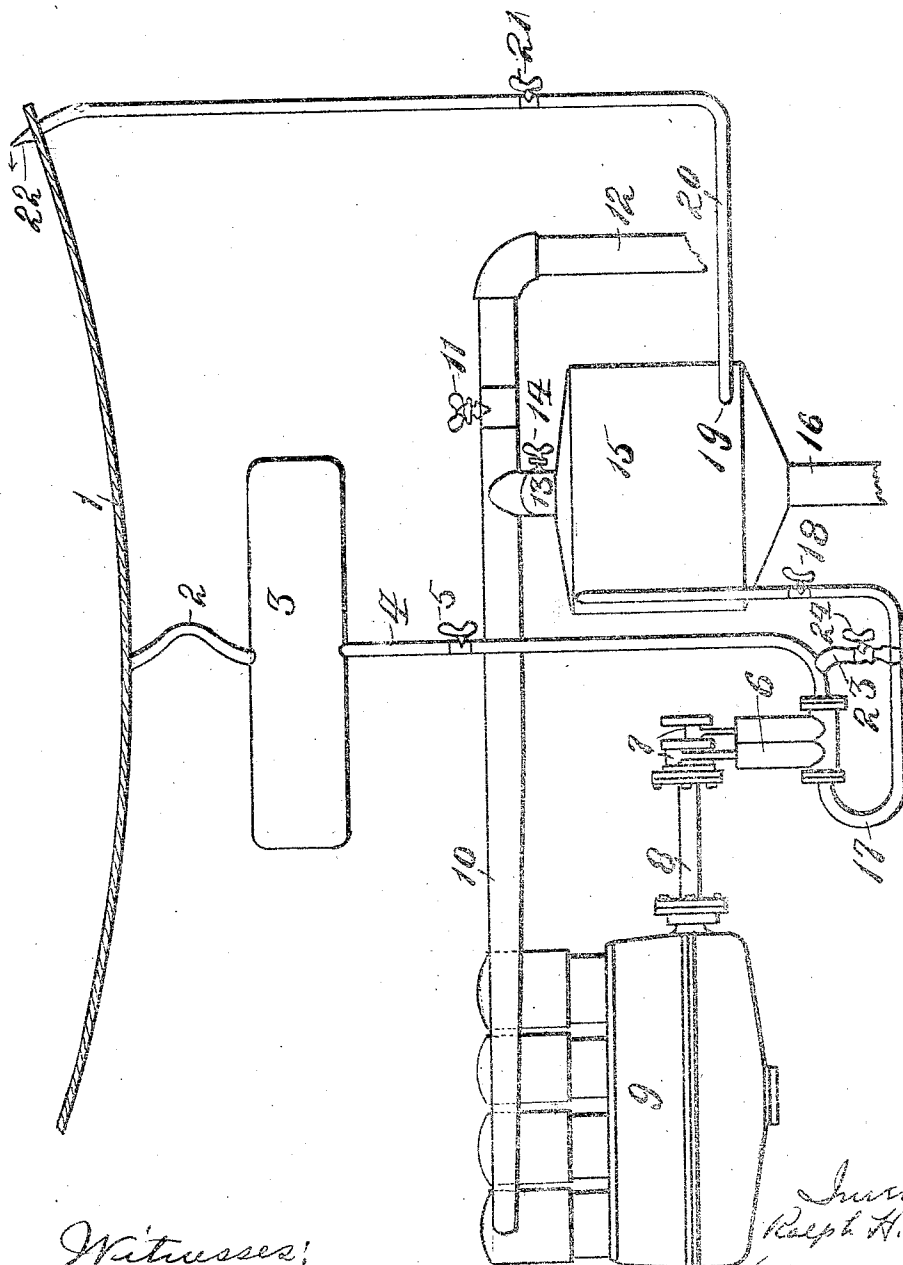


1,097,201.

Patented May 19, 1914.



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UNITED STATES PATENT OFFICE.

RALPH HAZLETT UPSON, OF AKRON, OHIO, ASSIGNOR TO THE GOODYEAR TIRE AND RUBBER COMPANY, OF AKRON, OHIO, A CORPORATION OF OHIO.

APPARATUS FOR HEATING INFLATING-GAS IN BALLOONS.

1,097,201.

Specification of Letters Patent.

Patented May 19, 1914.

Application filed January 29, 1913. Serial No. 745,027.

To all whom it may concern:

Be it known that I, RALPH HAZLETT UPSON, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented new and useful Improvements in Apparatus for Heating Inflating-Gas in Balloons, of which the following is a specification.

This invention relates to apparatus for artificially heating the gas used in balloons, especially of the dirigible type. Briefly, in large balloons, especially of the dirigible type, the volume of gas is, of course, increased by heat and reduced by cold, and hence, when the balloon is in use and the sun shines upon the gas bag of the balloon the latter is heated, thereby expanding the gas and increasing its lifting capacity, and when the sun is obscured the lifting qualities of the gas in the balloon are decreased. It therefore becomes extremely desirable to maintain the temperature of the gas as nearly constant as possible to thereby maintain the vertical equilibrium of the balloon. It will be obvious that as the gas generally employed for inflating balloons is hydrogen, and is highly inflammable, and the means for artificially heating the same must be of such a nature as will render the employment thereof absolutely safe.

More specifically, this invention contemplates producing a condensable fluid, such for instance, as steam, by utilizing the waste heat from the motor used for propelling the balloon and conveying the fluid generated by said waste heat to the interior of the balloon for heating the gas therein. The liquid produced by the condensation of the fluid returns to a pump by which it is again passed through a heating device to be again conveyed in the form of a condensable fluid to the interior of the balloon.

With the foregoing and other objects in view, the invention consists in the novel construction, combination and arrangement of parts constituting the invention to be hereinafter specifically described and illustrated in the accompanying drawing which forms a part hereof wherein is shown the preferred embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

The view presented for illustrating this

invention shows a wall of the balloon in section and the instrumentalities used for producing a condensable fluid diagrammatically and principally in side elevation.

Referring to the drawing in detail, the reference numeral 1 denotes a portion of the lower wall of a balloon from which leads a drip-pipe 2 into a tank 3. Extending from the drip-tank 3 is a depending pipe 4 provided with a valve 5 leading to a pump 6 operated by cranks 7 on an extension 8 of the shaft of a motor 9. The motor 9 is preferably a motor of the internal explosion type and is provided with a plurality of exhausts which communicate with a common exhaust pipe 10 provided with a valve 11 and opening at the end 12 to the air. Communicating with the exhaust 10 is a branch 13 provided with a valve 14. The lower end of the branch 13 is a hollow cylinder 15 provided with an exhaust 16 at its lower end. Extending from the opposite end of the pump is an outlet 17 provided with a valve 18 and extending into the interior of the heater 15 and within which the pipe 17 is formed into a series of coils, (not shown) so that the heat from the exhaust pipe 13 passing through the heater 15 will heat the liquid contained in the coils of the pipe 17 therein. The opposite end of the pipe 17 extends from the heater 15 at the point 19 and from thence extends a pipe 20, provided with a valve 21, upwardly through the wall of the balloon and it terminates in a discharge nozzle 22. Extending between the pipe 4 and the pipe 17 is a by-pass 23 provided with a valve 24.

The form of the engine, the exhaust, the heater, the pump, and the manner of connecting the pipes are all matters of detail which are not deemed necessary to describe or further illustrate in this application to enable a person skilled in the art to understand the same.

The operation of the device is as follows: When it is desired to heat the gas in the balloon the valve 5 in the pipe 4 is opened, allowing the liquid therein to pass to the pump and at the same time, the valve 24 is closed. The operation of the pump produces a current of liquid through the pipe 17 into the heater 15 where it is converted into a condensable fluid and passes upwardly through the pipe 20 and nozzle 22 into the interior of the balloon where it mingles with the gas and heats the same.

As the fluid used for heating the balloon condenses it flows downwardly into the pipe 2 in the tank 3, and from thence by the pipe 4 to the pump. When the temperature of the gas within the balloon is such as not to require heating, the valves 5, 14, 18 and 21 are closed and the valves 11 and 24 are opened. By opening the valve 24 the pump is permitted to work, causing the water within the pipe 4 to pass outwardly through the pipe 17 and back to the pipe 4 through the by-pass 23 past the valve 24. By closing the valve 14 and opening the valve 11, the products of combustion from the motor pass outwardly from the pipe 10 past the valve 11 and discharge into the air through the outlet 12.

I claim:

1. A device for heating the gas in an inflatable balloon comprising a heater adapted to be heated at will by the waste heat from a motor, a pump operable by a motor, a drain leading from the interior of said balloon to said pump, a conduit leading from said pump to said heater, a by-pass extending from said last-named conduit to said drain, and an outlet from said heater for the heated fluid leading to the interior of said balloon.

2. A device for heating the inflating fluid in a balloon comprising a motor, a conduit for the discharged heated products from said motor, a receptacle for said products, a pump operated by said motor connected

with a drain from said balloon, and a discharge pipe for said pump adapted to be heated by said heated products and arranged to discharge a condensable fluid to the interior of said balloon.

3. The combination with a balloon provided with a drain, of a pump connected with said drain and with the outlet thereof connected with the interior of said balloon, a motor operably connected with said pump for actuating the latter, a conduit for the heated products of combustion from said motor positioned in proximity to the outlet of said pump, whereby the fluid discharged from said pump is heated before passing to the interior of said balloon.

4. The combination with a balloon provided with a drain, of a pump connected with said drain and with the outlet thereof connected with the interior of said balloon, a motor connected with and adapted to operate said pump, a conduit for the heated products of combustion from said motor positioned in proximity to the outlet of said pump, whereby the fluid discharged from said pump is heated before passing to the interior of said balloon.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

RALPH HAZLETT UPSON.

Witnesses:

C. E. HUMPHREY,

A. L. MCCLINTOCK.