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H. RASMUSSEN ET AL

AIR MOISTENER

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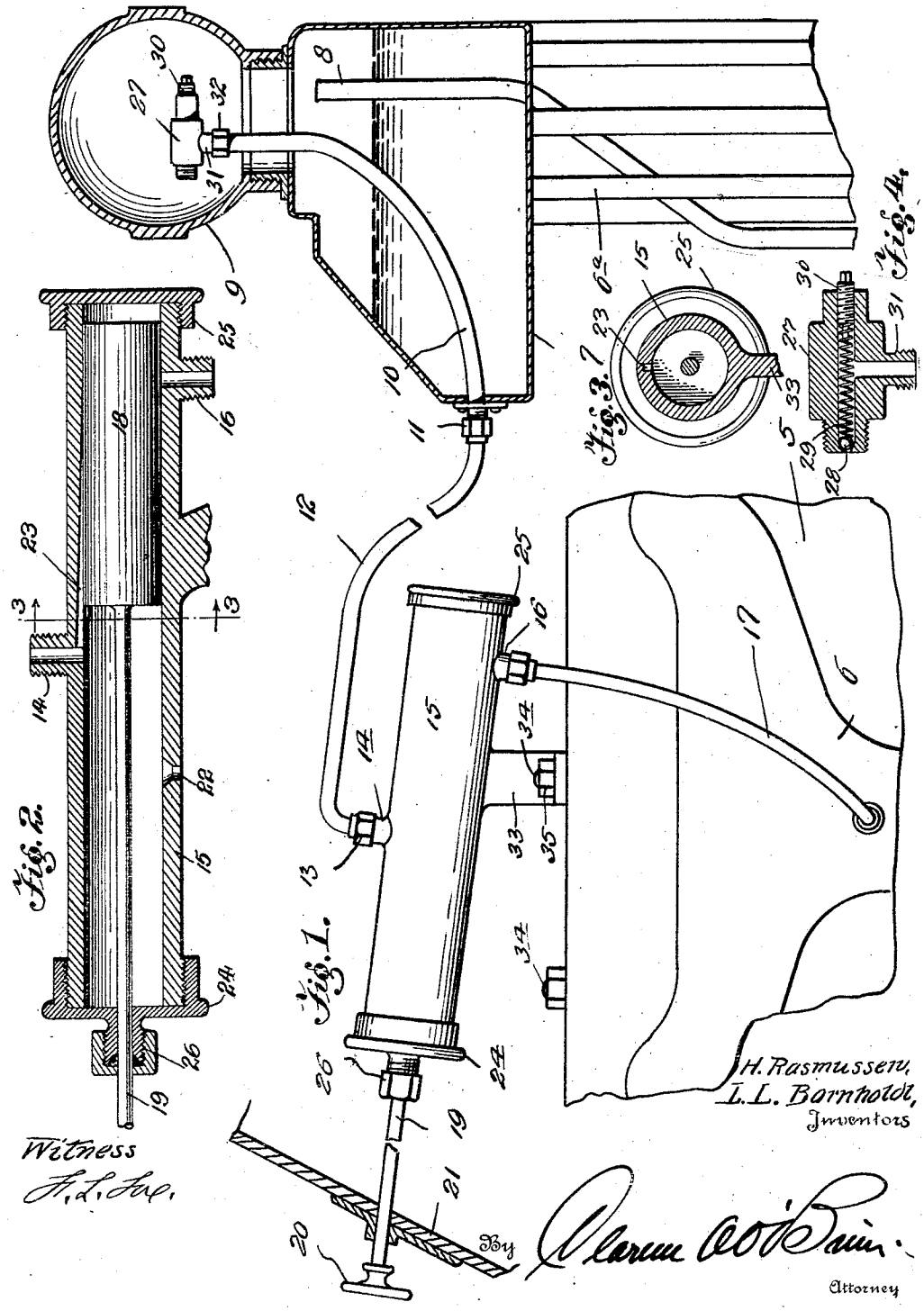

Patented June 9, 1925. 1,541,391

UNITED STATES PATENT OFFICE.

HERMAN RASMUSSEN AND LOUIS LAWRENCE BORNHOLDT, OF HIGHMORE, SOUTH DAKOTA.

AIR MOISTENER.

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To all whom it may concern:

Be it known that we, HERMAN RASMUSSEN and LOUIS L. BORNHOLDT, citizens of the United States, residing at Highmore, in the county of Hyde and State of South Dakota, have invented certain new and useful Improvements in Air Moisteners, of which the following is a specification.

This invention relates to certain new and useful improvements in air moisteners, and has particular reference to a device for supplying moist air to the cylinders of internal combustion engines.

The primary object of the invention is to provide a device of the above kind which embraces the desired qualities of simplicity, durability, and efficiency in operation, whereby the same may meet with all of the requirements for a successful commercial use.

Another object of the invention is to provide means for conveying steam and air from the upper part of the radiator of the cooling system of a water cooled engine to the cylinders of said engine whereby the efficiency of operation of the engine is enhanced, carbon deposits in the engine cylinders minimized, and the consumption of fuel made most economical for the efficient operation of the engine.

A further object is to provide improved means for controlling the amount of moist air allowed to be drawn into the engine cylinders from the radiator.

With the above general objects in view, and others that will appear as the nature of the invention is better understood, the same consists in the novel form, combination, and arrangement of parts, hereinafter more fully described, shown in the accompanying drawing, and claimed.

In the drawings, wherein like reference characters indicate corresponding parts throughout the several views,

Figure 1 is a view partly in side elevation, and partly in section, showing an air moistener constructed in accordance with the present invention and operatively related to the radiator and engine of a motor vehicle, parts being broken away.

Figure 2 is an enlarged central longitudinal sectional view, of the control valves partly broken away.

Figure 3 is a transverse sectional view, taken on the line 3—3 of Figure 2, and

Figure 4 is a longitudinal sectional view of the check valve.

Referring more in detail to the drawings, 5 indicates the internal combustion engine forming part of the power plant of a motor vehicle, and having an intake manifold as generally indicated at 6, through which the explosive mixture passes at proper intervals into the cylinders of the engine. The internal combustion engines of these motor vehicles are usually provided with a cooling system employing water as a cooling medium, and embodying an air cooled radiator provided with vertical water tubes 6^a or the like connecting top and bottom headers, the top header being shown as at 7 and provided with an overflow pipe as at 8, as well as being provided with a filling opening, by means of which the water in the filling system may be replenished, said filling opening having a suitable closure cap, as at 9, that is preferably in the form of a steam dome as shown. The overflow pipe 8 has its upper open end disposed above the proper level of the water within the radiator as indicated in Figure 1, so that when an excess amount of water is placed within the radiator, the same may flow outwardly through said pipe 8 whose other end is open to the atmosphere. The structure thus far described is old and well known in the art.

In accordance with the present invention, a pipe or tube 10 is extended through the rear wall of the top header 7 of the radiator and upwardly through the filler opening of said radiator, where its upper end terminates within the steam dome formed within the cap 9. The pipe 10 is coupled at its outer lower end as at 11 with a pipe 12 whose rear end is coupled as at 13 with the intake 14 of a cylindrical valve casing 15. The valve casing 15 is provided with an outlet as at 16 adjacent the forward end thereof as shown in Figures 1 and 2, while the intake or inlet 14 is located substantially midway between the ends of the casing 15,

the outlet 16 being connected by a conduit or pipe 17 with the manifold 6, as shown in Figure 1.

Slidably disposed and fitted within the cylinder or casing 15 is a cylindrical valve head or piston valve 18, that is provided with a central operating rod 19 suitably connected to means such as a knob or handle 20 extending through the dash board 21 of the vehicle by means of which the valve 18 may be controlled. The casing 15 is provided with a drain opening 22 in the bottom thereof, rearwardly of the intake opening at 14, and a longitudinal tapering groove 23 is provided interiorly of the casing with its deeper end communicating with the intake 14 and with its shallow end terminating adjacent the outlet 16 as shown in Figure 2. The ends of the casing 15 may be closed, by means of screw caps 24 and 25, the cap 24 at the rear end of the casing being provided with a central opening through which the rod 19 extends, and about which is provided a suitable packing gland as at 26.

Should the end of the pipe 10 within the cap 9 be left constantly open so that water may flow thereinto under certain conditions, the drain opening 22 will allow such water to pass out of the valve casing when the device is not in use and the valve head 18 is disposed in forwardly moved position for closing the outlet 16. However, in order to effectively prevent entrance of the water into the pipe 10 from the radiator when the device is not in use, the end of the pipe 10 within the cap 9 may be equipped with a check valve of the form more clearly shown in Figure 4. This check valve comprising a T-fitting 27 formed with an internal valve seat at one branch thereof for engagement by a ball valve 28, that is urged outwardly toward said seat by means of a suitable helical compression spring 29, the seating strand of which may be adjustably controlled by means of a screw plug 30, against which the adjacent end of the spring 29 bears, and which is adjustable longitudinally in the other flange of said fitting 27 toward the valve seat. The intermediate or other flange of the fitting 27 is indicated at 31, and is adapted to be coupled by means of a coupling 32, or the like with the adjacent end of the pipe 10. By means of this construction, the valve 28 is normally seated, but when the piston 18 is moved toward the left or rearwardly, so as to uncover the ports 14 and 16, the suction from the engine will cause unseating of said valve 28 and allow the steam and air within the cap 9 to flow through the pipes 10 and 12 into the forward end of the casing 15 and then through pipe 17 into the manifold 6, from whence it is fed into the cylinder. The groove 23 provides means whereby the amount of steam and air allowed to pass to the pipe 17 from the cap 9 may be regulated upon proper adjustment of the piston 18, it being apparent that when said piston is positioned at various distances between the intake and outlet ports 14 and 16, the amount of steam and air allowed to pass through the valve casing will be regulated. This is desirable, because the engine requires moistened air in a greater quantity at certain times than at other times.

The valve casing 15 is preferably mounted upon the top of the engine 5, and one means of rigidly attaching the same in this position consists in providing the casing with a depending rigid angular bracket 33, the lower horizontal arm of which is apertured for reception of one of the bolts 34, by means of which the head of the engine block is secured in place, the usual nut of said bolt being threaded upon the same and upon the horizontal portion of the bracket 33 as indicated at 35, for this purpose.

In operation, assuming that the engine 5 is working, and the piston valve 18 is positioned as shown in Figure 2, so as to close the outlet port 16 of the valve casing 15, moistened air or air and steam may be fed to the engine cylinders, by pulling upon the rod 19 for moving the piston 18 rearwardly beyond the intake port 14. When this takes place, the suction in the manifold 6 results in drawing the steam in the pipe 10 by causing opening of the valve 28, and then through pipes 12 and 17. By adjusting the piston valve 18 forwardly of the intake port 14, the amount of moistened air allowed to flow through the pipe 17 will be regulated in accordance with the area of the groove 23 at the forward end of said piston valve 18, depending upon the particular position of adjustment of the latter.

From the above description it will be seen that we have provided a simple and durable form of air moistener which may be conveniently applied to existing motor vehicles that are driven by water cooled internal combustion engines. It will also be seen that the device embodies comparatively few parts liable to get out of order and these so co-related as to assure efficiency in operation.

Minor changes may be made without departing from the spirit and scope of the invention as claimed.

What we claim as new is:

An air moistener comprising a cylinder provided intermediate its ends with an intake port and adjacent one end with a discharge port, the inner surface of the wall of said cylinder being provided with a groove extending from said intake port toward one end of the cylinder, said groove gradually decreasing in depth from said intake, a valve reciprocable in said cylinder,

and cooperative with said ports and groove, an operating rod for said valve, a conduit connected with said discharge port and adapted for connection to the intake manifold of an internal combustion engine, and a steam supply conduit having a suction-controlled spring-pressed check valve at its inlet end connected with said intake port and adapted to have one end portion disposed within the steam space of an automobile radiator.

In testimony whereof we affix our signatures.

LOUIS LAWRENCE BORNHOLDT.
HERMAN RASMUSSEN.