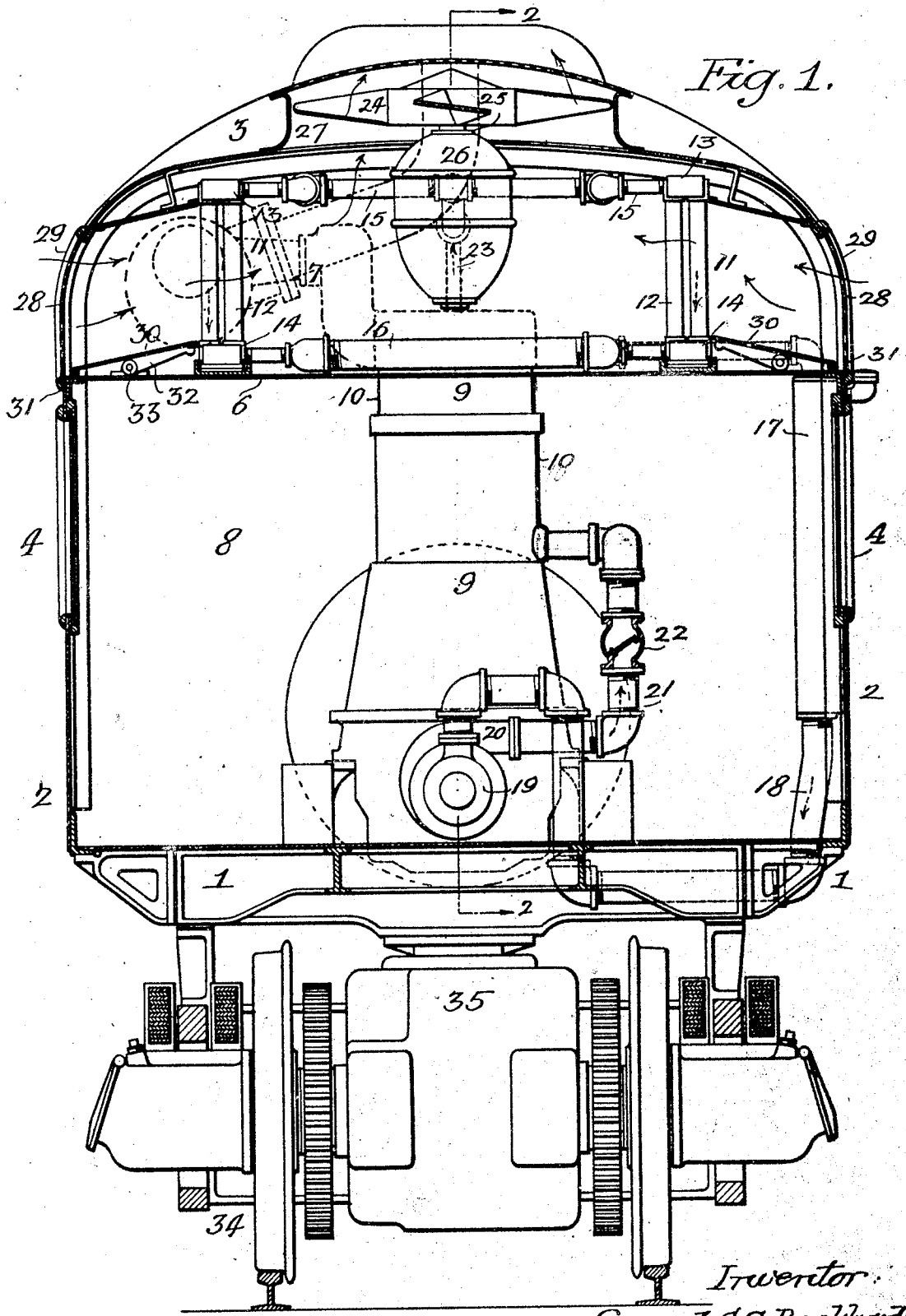
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COOLING SYSTEM FOR INTERNAL COMBUSTION LOCOMOTIVES

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Fig. 1.

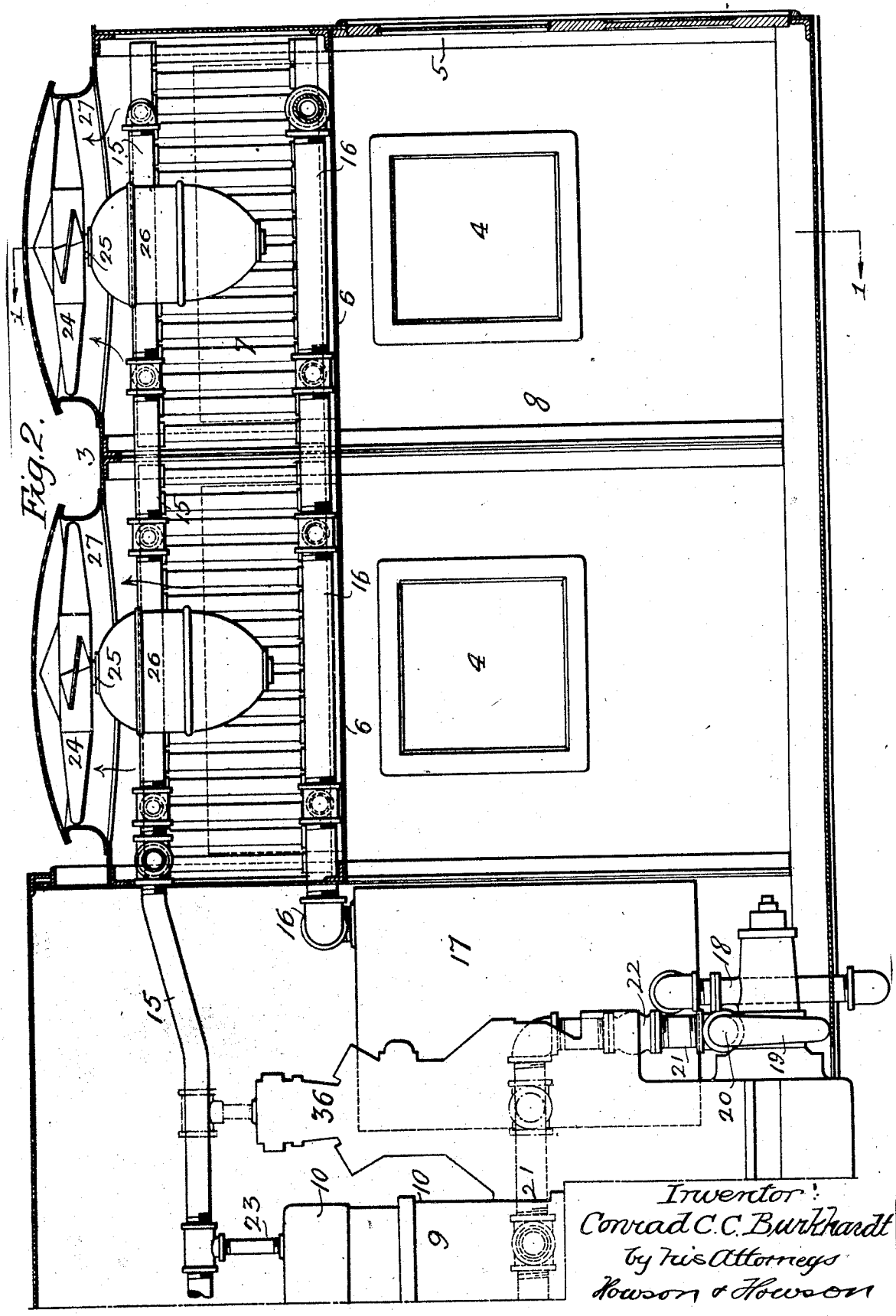


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COOLING SYSTEM FOR INTERNAL COMBUSTION LOCOMOTIVES

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Patented Mar. 25, 1930 1,752,230

UNITED STATES PATENT OFFICE

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COOLING SYSTEM FOR INTERNAL-COMBUSTION LOCOMOTIVES

Application filed February 11, 1928. Serial No. 253,737.

My invention relates to certain improvements in cooling systems for internal combustion locomotives, of the type in which the radiators are located in the upper portion of the locomotive and cooled by circulation of air produced by motor-driven fans.

One object of my invention is to so construct the cooling system of an internal combustion locomotive that the water can be drained from the radiator into a reserve tank when the engine is standing, without draining the water from the water jacket of the engine, the cylinders of which extend above the lower portions of the radiators.

A further object of my invention is to provide means for closing the inlet openings for the air, so as to prevent the ingress of snow and rain.

A still further object of my invention is to so design the locomotive that the space under the air circulating chamber will be entirely free and open from side to side and at the front so that the operator will have a clear vision.

In the accompanying drawings:

Fig. 1 is a sectional view of an internal combustion locomotive of the Diesel type, illustrating my invention, the air compressor being omitted; and

Fig. 2 is a longitudinal sectional view of one end of the locomotive on the line 2—2, Fig. 1.

Referring to the drawings, 1 is the base frame of a locomotive; 2 are the side walls; and 3 is the roof made in any form desired. In the side walls are windows 4 and at the forward end are windows 5.

6 is a ceiling which separates the air circulating chamber 7 from the operator's compartment 8, and all overhead water circulating mechanism is located above this ceiling.

The "Diesel" internal combustion engine is shown in outline at 9, and surrounding the cylinders are water jackets 10. The cylinders and water jackets extend above the lower portions of the radiators 11 in which the water circulates. Each radiator consists of vertical tubes 12, an upper header 13, and a lower header 14.

15 is a pipe communicating with the upper headers 13, and 16 is a pipe communicating with the lower headers 14. Connected to the pipe 16 is a tank 17, shown clearly in Fig. 2. This tank, at present, is located at one side of the locomotive, the bottom of the tank being below the water jackets of the engine. The tank is of sufficient size to receive the water that is drained from the radiators 11 when the locomotive is stopped. Connected at the bottom of this tank is a pipe 18, which is the intake pipe of a pump 19 driven from the engine.

20 is the discharge neck of the pump connected to a pipe 21, which, in turn, is connected to the water jacket 10 of the internal combustion engine 9. In this pipe is a check valve 22, which is opened by the pressure of water when the pump is in motion and which closes when the pump is stopped, so as to prevent draining of the water from the water jacket of the internal combustion engine.

The pipe 15 is connected to the upper end of the water jacket of the engine by a short pipe 23, so that the circulation of water is from the pump, through the check valve 22, into the water jacket 10 of the engine, from the water jacket 10 through the pipe 23 to the pipe 15, through both radiators 11 to the return pipe 16 and tank 17, and from this tank through the pipe 18 to the pump 19.

When the locomotive is standing and the pump is out of action, then the circulation stops and the water that is in the two radiators and the connecting pipes 15 and 16 flows into the tank 17, but the water in the water jacket of the internal combustion engine remains in the jacket due to the fact that the check valve 22 is closed by the weight of water in the pipe 21, which prevents the escape of water from the jacket through the pipe to the pump. Thus. in cold weather, the water in the radiators is immediately withdrawn when the engine is standing, but the water in the water jacket of the engine is retained, as it is more or less protected by being enclosed within the locomotive.

In the present instance the air is circulated by means of a fan 24 mounted on a vertical shaft 25 of a motor 26. The motor, which may be of any type desired, is located above

the ceiling 6 and is supported in any suitable manner.

The fan 24 is located in an outlet flue 27 communicating with the air chamber 7, which receives air through the openings 28 at the side of the roof of the locomotive. These openings are provided with screens 29 of any suitable mesh and in order to close, or partly close, these openings in stormy weather, shutters 30 are provided. These shutters are pivoted, in the present instance, at 31, and arms 32, which are mounted on longitudinal shafts 33, are so located that on turning the shaft 33 by any suitable means, the arms can be turned and will raise the shutters 30 to closed position.

In the present instance there are two circulating fans at the end of the locomotive, and there are two inlet openings at each side of the locomotive frame, but it will be understood that a single fan may be used, and that the space between the engine and the end of the locomotive may be of any suitable length. It will be understood that this mechanism may be duplicated at the opposite end of the locomotive, if desired.

The locomotive is mounted on trucks 34 of any type, and on these trucks are the driving motors 35 which are connected to generators located on the body of the locomotive, the generators being driven from the Diesel internal combustion engine shown in diagram.

36 is an air compressor, and the water space surrounding the cylinder of this air compressor may be connected, if desired to the circulating pipe 21 and the circulating pipe 15, as shown by dotted lines in Fig. 2. The air compressor has been omitted in Fig. 1 so as to more clearly illustrate the connection of the pipes with the water space 10 of the internal combustion engine 9.

I claim:

1. The combination in an internal combustion locomotive, of a base frame; a body mounted on the base frame and having windows in each side and end; a ceiling extending over the operator's compartment; radiators located in the space above the ceiling; air inlets at the sides of said space; a fan for drawing the air through the space occupied by the radiators and discharging it at the roof of the car; an electric motor in said space for driving the fan; an internal combustion engine extending above the bottom of the radiators and having a water jacket; a pump driven by the engine; pipes leading from the pump to the water jacket of the engine; a check valve in said pipe; a tank at one side of the engine; pipes leading from the water jacket of the engine to the upper portion of the radiators; pipes leading from the lower portion of the radiators to the tank; and a pipe leading from the tank to the pump, the parts being so arranged that when the locomotive is stopped the water will flow from the radiators into the tank and the check valve will close, preventing the flow of water from the water jacket of the engine.

2. The combination in an internal combustion locomotive having an overhead air circulating space, of radiators in said space; openings in the sides for the admission of air; a circulating fan; a motor for driving the fan and located in the air space; a shutter pivotally mounted at each side of the air space and arranged to close the side openings; a longitudinal operating shaft at each side; and arms on the shafts arranged to raise the shutters when the shafts are turned.

CONRAD C. C. BURKHARDT.