(No Model.) 2 Sheets—Sheet 1.

M. REID.

REFRIGERATING MACHINE.

No. 598,814. Patented Feb. 8, 1898.

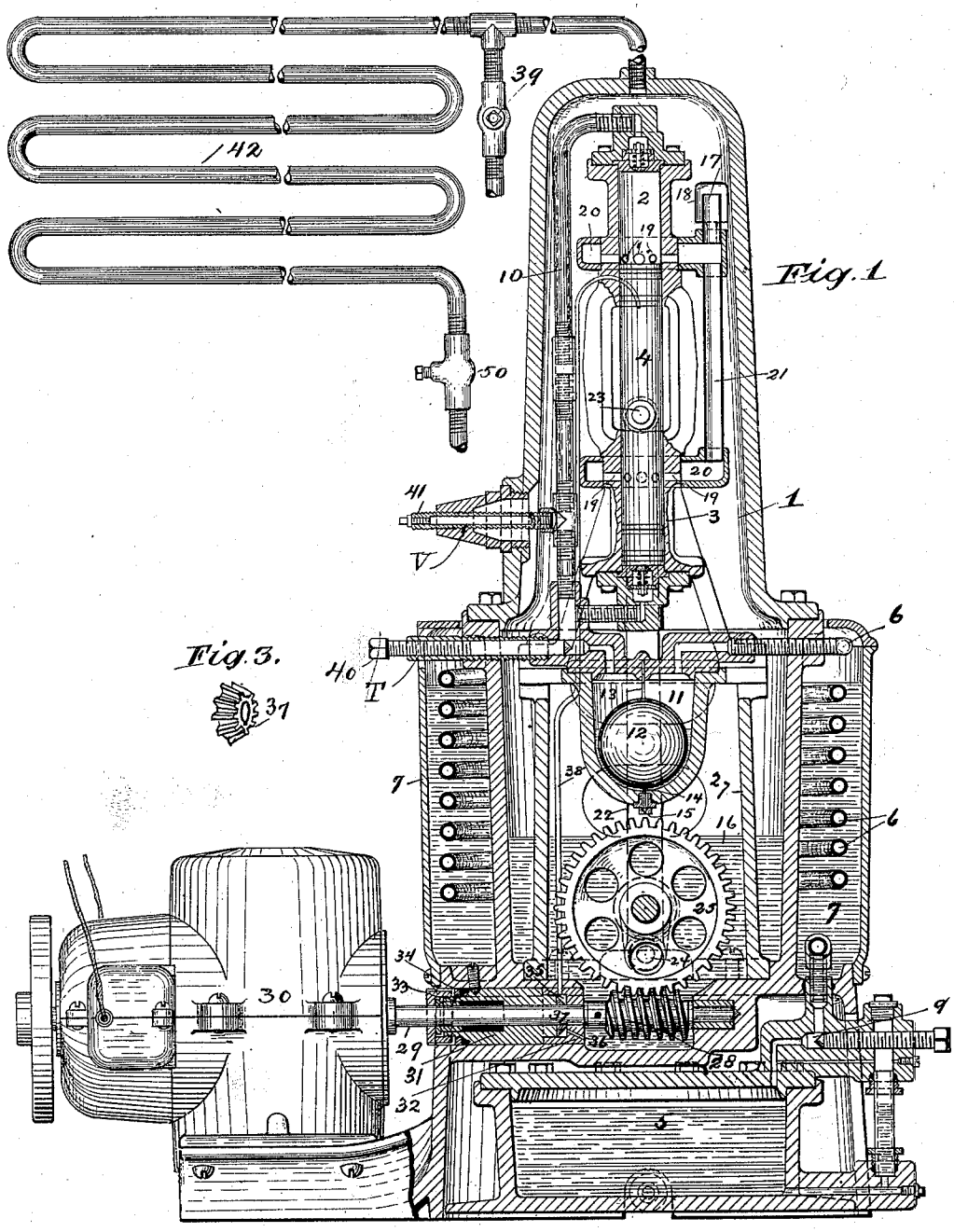


Fig. 1.

Fig. 3.

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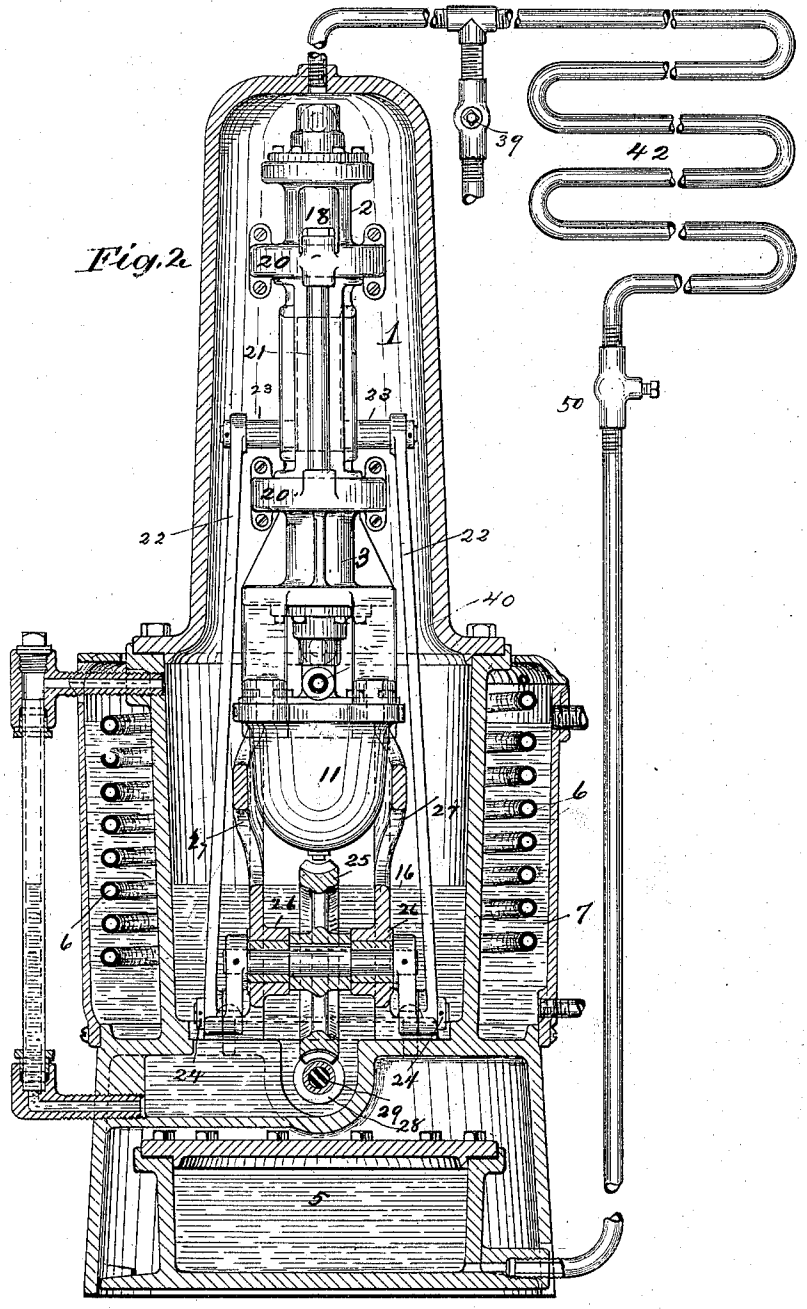
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Fig. 2.



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UNITED STATES PATENT OFFICE.

MARCELLUS REID, OF CLEVELAND, OHIO.

REFRIGERATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 598,814, dated February 8, 1898.

Application filed January 4, 1896. Serial No. 574,407. (No model.)

To all whom it may concern:

Be it known that I, MARCELLUS REID, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Refrigerating-Machines, of which I hereby declare the following to be a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in refrigerating machinery in which anhydrous ammonia or a similar volatile liquid refrigerant is employed; and the objects of the invention are to provide a simple and efficient form of gas compressor and condenser in which the spent-gas chamber serves to equalize the pressure upon the refrigerating-coils and in which all the operative machinery, including the oil mechanism and oil-separator, are inclosed within the spent-gas chamber, in this manner preventing the escape of the gas and rendering all the working parts compact and easily accessible for removal or repairs.

My invention further consists in the combination and arrangement of the various parts and in the construction of details, as hereinafter described, shown in the accompanying drawings, and more specifically pointed out in the claims.

In the accompanying drawings, Figure 1 shows a vertical sectional view of the machine, taken on center line of driving-shaft. Fig. 2 shows a similar view taken transversely of the shaft. Fig. 3 is a detail of oil-distributing device.

In the views, 1 is the spent-gas receiver, within which are placed the cylinders 2 and 3 and in which works the elongated piston-plunger 4, which is arranged in vertical alinement, so that one cylinder is exhausted at the moment that the other is filling, in this manner insuring a steady regular flow of fluid into the receptacle 5 through the condensing-coils 6. These coils pass through the water-jacket 7, which in turn absorbs the heat in the liquefied agent. Then it passes into the condensed-gas receptacle 5, where its entrance is controlled by the needle-valve 9. The liquefied gas before entering the coil 6 passes through a straight section of the pipe 10 and thence through the oil separator or trap 11, in which lies the float 12, provided with the guide-stems 13 and 14, the lower end of which is a needle-valve placed in the seat 15.

In operation as the oil settles from the liquefied gas into the pocket or trap 11 it will raise the float until admission is given through the valve, where the oil will fall into the oil-reservoir 16.

The entrance to the pump-cylinders for spent gas is seen at 17, where it is covered by a cap 18, to prevent the entrance of oil thrown up from the working parts of the machine.

Each cylinder is pierced with inlet-ports 19, surrounded by the annular chambers 20, which are connected by the pipes 21 in continuation of the inlet-opening 17.

The piston-plunger is operated by means of side rods 22, connected by wrist-pins 23 and 24 with the piston-plunger and worm-gear, respectively, which is mounted in bearings 26 upon the standard 27, which supports the pump-cylinders and oil-trap 11. This gear is driven at a slow speed by means of the worm 28 upon the main shaft 29, upon the outer extremity of which is placed the armature of the motor 30 or other desired power, the character of which is not essential to the invention.

The lower portion of the spent-gas reservoir, in which the gearing is exposed, becomes the oil-chamber 16, which effectually seals the opening for the shaft through the wall of the case.

The shaft-bearing is formed in hardened sleeves 31 and 32 with outer and inner stuffing-boxes 33 and 34. Between the sleeves is arranged the annular space 35, connected with the inner oil-reservoir by the perforation 36, and in this space rotates the cone-disk 37, the function of which is to throw the oil upward through the pipe 38 and deposit it upon the piston-plunger and thus insure constant lubrication therefor.

In charging the machine the valve 40 is first closed. The air-valve 41 is then opened and the piston worked as an air-pump to withdraw the air from the coils and machine until a vacuum is produced. Then the air-valve 41 is closed and the valve 40 opened. Next valve 39 is opened, which connects with a supply-tank. The vacuum produced in the

machine will then draw in the refrigerant gas. By closing the valve 39 the refrigerant gas is cut off from the supply-tank. The valve 50 is then opened, which connects the refrigerating-coil 42 with the refrigerant-receptacle 5, when the machine will be ready for use. The valves 40 and 41 are inserted through the outer casing, so as to be readily accessible, and the sleeves *v t* protect the passages so as to prevent a possible escape of gas through the casing.

By the construction of machine as shown with an enlarged chamber for the reception of spent gas special advantages are obtained. In the first place, as stated, a perfect seal is obtained for the gas, since all working parts of the machine are inclosed within the chamber, and, secondly, the chamber serves as a reservoir for gas maintained under a constant pressure and hence will have the effect of sustaining the pressure in the refrigerating-coils under various conditions of temperature and so equalize the load upon the motive power, since when the pressure in the coil fluctuates from changes of temperature the speed of the engines must vary also according to the load it sustains.

Having thus described my invention, I claim—

1. In a refrigerating-machine, a double single-acting pump provided with two cylinders and continuous piston movable from below annular passages about said cylinders provided with ports opening into said cylinders, and a connecting-passage between said annular passages, a cap or hood over the open extremity of the connecting-passage and an inclosing case about the pump, all combined as and for the purpose set forth.

2. In a refrigerating-machine, the combination with a pump and oil-separator, a refrigerant-receptacle and exhaust-pipe connecting the pump, oil-separator and said receptacle, of an air-tight casing inclosing the pump, oil-separator and exhaust-pipes whereby the oil discharged from the separator will reënter the casing, and means for preventing the admission of oil through the gas-inlet pipe to the pump-cylinder consisting of a hood or cap over the inlet pipe or passage, substantially as described.

3. In a refrigerating-machine, the combination with a pump driven from below and suitable driving-gear therefor, of an exhaust-pipe from the pump, an oil-separator on the exhaust-pipe adapted to discharge directly upon the driving mechanism, an air-tight casing inclosing said pump-driving mechanism exhaust-pipe and oil-separator, and means for preventing the entrance of oil splashed upward by the driving mechanism into the pump-cylinders, substantially as described.

In testimony whereof I hereunto set my hand this 2d day of December, 1895.

MARCELLUS REID.

Witnesses:
WM. M. MONROE,
H. H. HENRY.