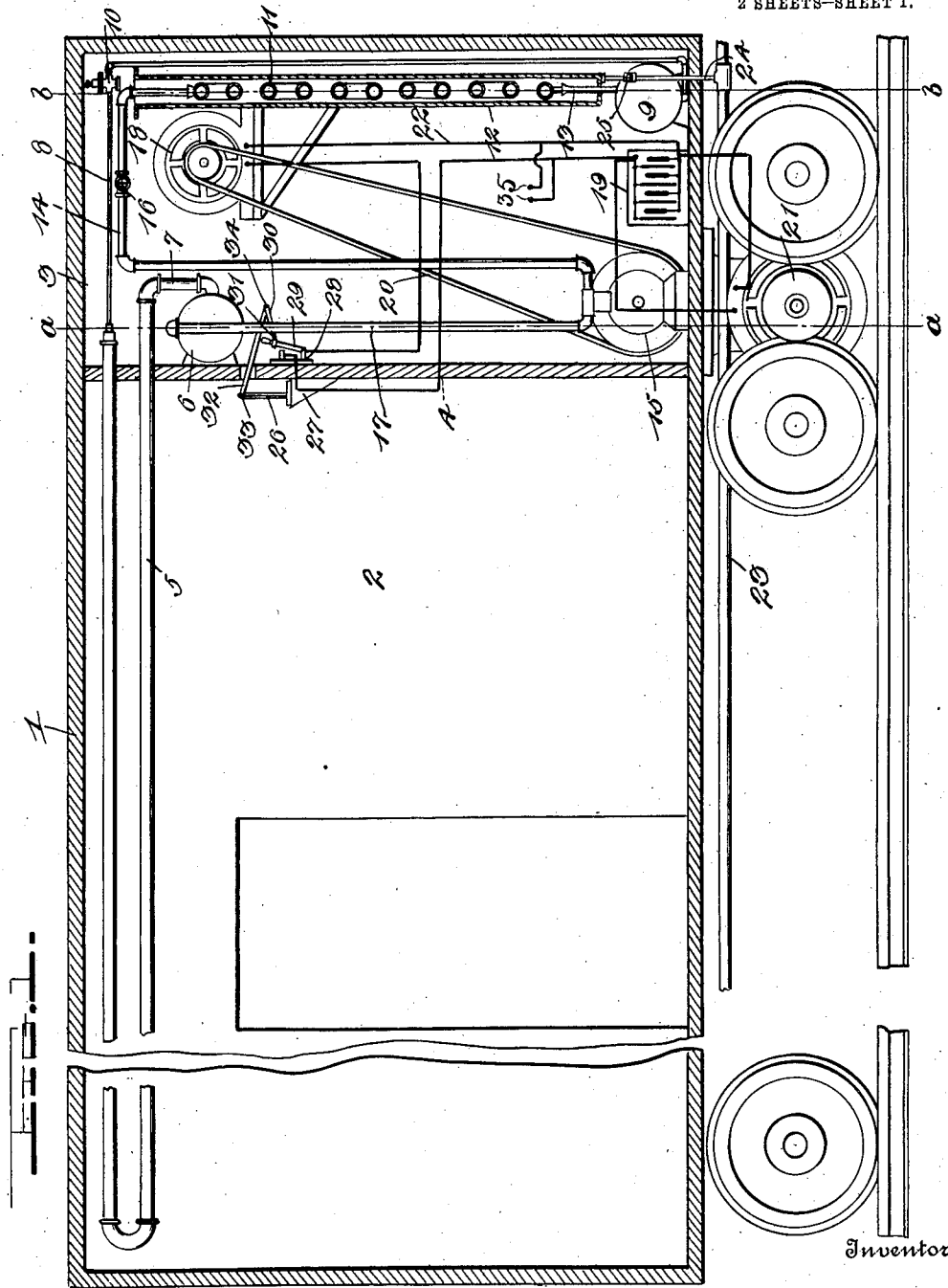


McNARY F. ADAMS.
REFRIGERATING APPARATUS.
APPLICATION FILED DEC. 5, 1911.

1,069,840.

Patented Aug. 12, 1913.

2 SHEETS—SHEET 1.



Inventor

McNary F. Adams,

Witnesses

Chas. L. Griebauer.
A. B. Norton.

By

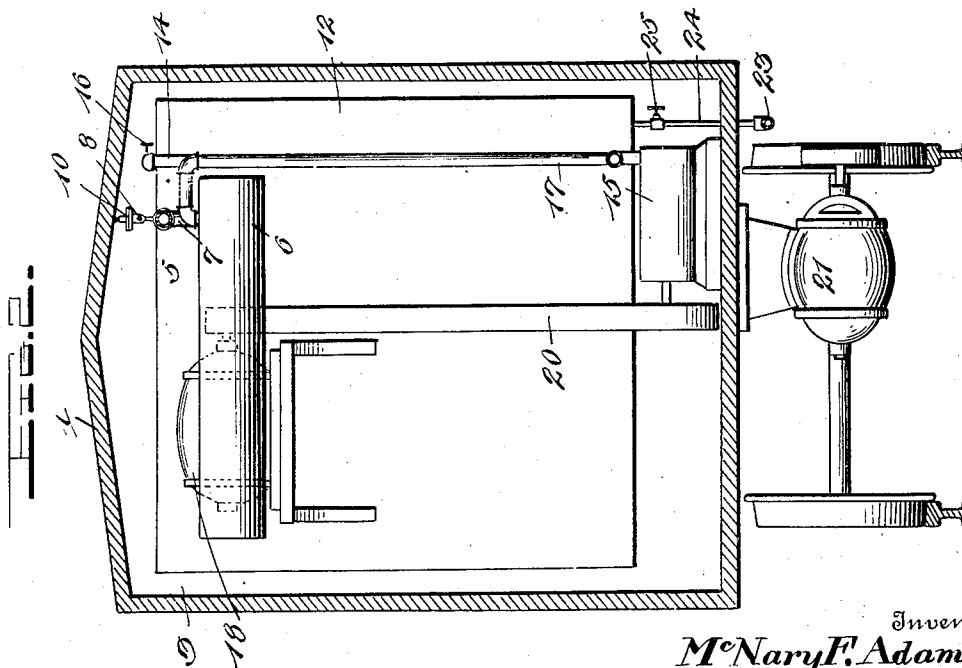
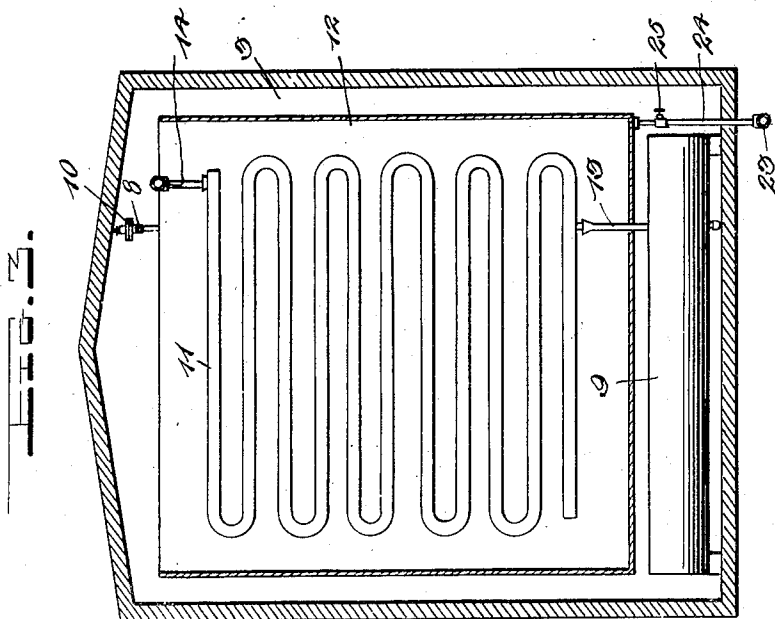
Watson E. Coleman
Attorney

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UNITED STATES PATENT OFFICE.

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REFRIGERATING APPARATUS.

1,069,840.

Specification of Letters Patent.

Patented Aug. 12, 1913.

Application filed December 5, 1911. Serial No. 664,102.

To all whom it may concern:

Be it known that I, MENARY F. ADAMS, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Refrigerating Apparatus, of which the following is a specification, reference being had to the accompanying drawings.

This invention is an improved automatically operating refrigerating system for use on railway cars and also for use in connection with a common house refrigerator, a cold storage room, or any other form of refrigerator or cooling chamber, the object of the invention being to provide a compact refrigerating apparatus which may be contained in a comparatively small chamber, admitting of its use on railway cars and in other places where space is limited, and which, when once started in operation, continues to operate indefinitely and is automatically controlled so as to adapt itself to variations of temperature in the refrigerating chamber and hence dispense with the services of an attendant.

The invention consists in the construction, combination and arrangement of devices hereinafter described and claimed.

In the accompanying drawings: Figure 1 is a sectional view of a refrigerating car provided with my improved automatically operating refrigerating system, the storage battery and the condenser being indicated in section; Fig. 2 is a vertical sectional view of the same on the plane indicated by the line *a-a* of Fig. 1; and Fig. 3 is a similar view of the same on the plane indicated by the line *b-b* of Fig. 1.

For the purposes of this specification my improved automatically operating refrigerating system is shown installed in a refrigerator car 1, which comprises a refrigerating chamber 2 and a chamber 3 in which the operating parts of the refrigerating system are installed, the said chambers being separated by a partition wall 4 and the chamber 3 being of small capacity as compared with the refrigerating chamber 2, the refrigerating apparatus, in accordance with my invention, being compactly disposed and taking up only a small portion of the space in the car.

The usual expansion or evaporating pipes 5 are shown in the upper portion of the refrigerating chamber 2, an auxiliary am-

monia receiver is indicated at 6, connected to the expansion or evaporating pipes, as at 7, and a pipe 8 of reduced diameter leads to the expansion or evaporating pipes 5 from the bottom of a liquid ammonia receiver 9 and the said pipe is provided with the usual expansion valve 10. A condensing coil 11 is arranged in a water tank 12, the said tank being arranged in one end of the chamber 3 and preferably near the adjacent end of the car. The lower end of the condensing coil is connected to the receiver 9 as at 13, and the pipe 14 leads to the upper end of the said condensing coil from a compressor pump of the common rotary type, indicated at 15, the said pipe 14 being provided with a check valve, which is indicated at 16. A pipe 17 discharges into the compressor from the auxiliary receiver 6.

The operation of the refrigerating apparatus *per se* will be readily understood by those skilled in the art to which my invention relates and need not be described. All these parts of the apparatus are located in the chamber 3. Also arranged in the said chamber is an electric motor 18 and a storage battery 19. The driving pulley of the electric motor is connected to that of the compressor pump by means of an endless belt 20. An electric generator 21 is also provided, which is arranged under the bottom of the car and is suitably connected to one of the car axles to be driven thereby. The generator is connected in electric circuit with the storage battery and also with the electric motor by means of suitable conductors indicated at 22. Below the car is an air pipe 23 which is connected by a branch 24 to the bottom of the tank 12 of the condenser coil and this branch pipe includes a valve 25. Air is forced by this means to the bottom of the tank 12 and passes up through the water therein for the purpose of reducing its temperature, as will be understood. I also arrange in the refrigerating chamber a thermostat 26 which is here indicated as a bar secured at one end on a suitable bracket or support 27 and comprises members of different metals having different co-efficients of expansion so that the free, upper end of the thermostatic bar is adapted to move to a considerable extent under variations of temperature in the refrigerating chamber. I also arrange, in the chamber 3, an electric switch 28, the terminals of which are included in

the motor circuit. The movable element of this switch, which is here shown as a knife 29, is operated by a rod 30 which is pivotally connected to its upper end, as at 31. A rod 32 is directly pivotally connected to the upper end of the thermostatic bar as at 33 and is also pivotally connected to the rod 30 as at 34. When the temperature in the refrigerating chamber is as low as is desired the switch is kept open by the thermostat and hence the motor and the compressor will remain inoperative. When, however, the temperature rises in the refrigerating chamber the thermostat acts to close the switch and thereby start the motor and hence the refrigerating apparatus in operation.

It will be understood from the foregoing that the operation of the apparatus is entirely automatic and that it does not require the services of an attendant.

When my automatically operating refrigerating system is in use on a car as here shown I also provide the car with electric connections 35 whereby the motor may be supplied with current from any source of electric power, when the car is at a station or is held on a side track. Within the scope of my invention, also, the generator may be driven by other means than by being connected to one of the car axles.

Having thus described my invention I claim:

The combination with a refrigerating car,

of refrigerating apparatus including a flat oblong upright cooling tank near one end wall of the car extending from near the bottom to just below the roof of the car, an ammonia supply reservoir extending longitudinally of and underneath said cooling tank, a cooling coil comprising superposed flat convolutions disposed in said tank, a pipe connection from said reservoir opening through the bottom of said tank and connected to said coil, an auxiliary ammonia reservoir disposed near the top of the car, a U-shaped pipe disposed vertically between said auxiliary reservoir and said tank with the lowest point of the bight disposed near the car floor, one leg of said pipe being connected to said auxiliary reservoir, and the other leg having a horizontal extension entering the open top of said tank and connected to said coil, a compressor communicating with the bight of said pipe, an evaporating pipe extending from said auxiliary reservoir and disposed horizontally above said auxiliary reservoir, a reduced pipe connection between said evaporating pipe and said supply reservoir, and means for actuating said compressor.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

McNARY F. ADAMS.

Witnesses:

IRENE E. YOUNG,
R. R. ROLLINS.