

Sept. 17, 1929.

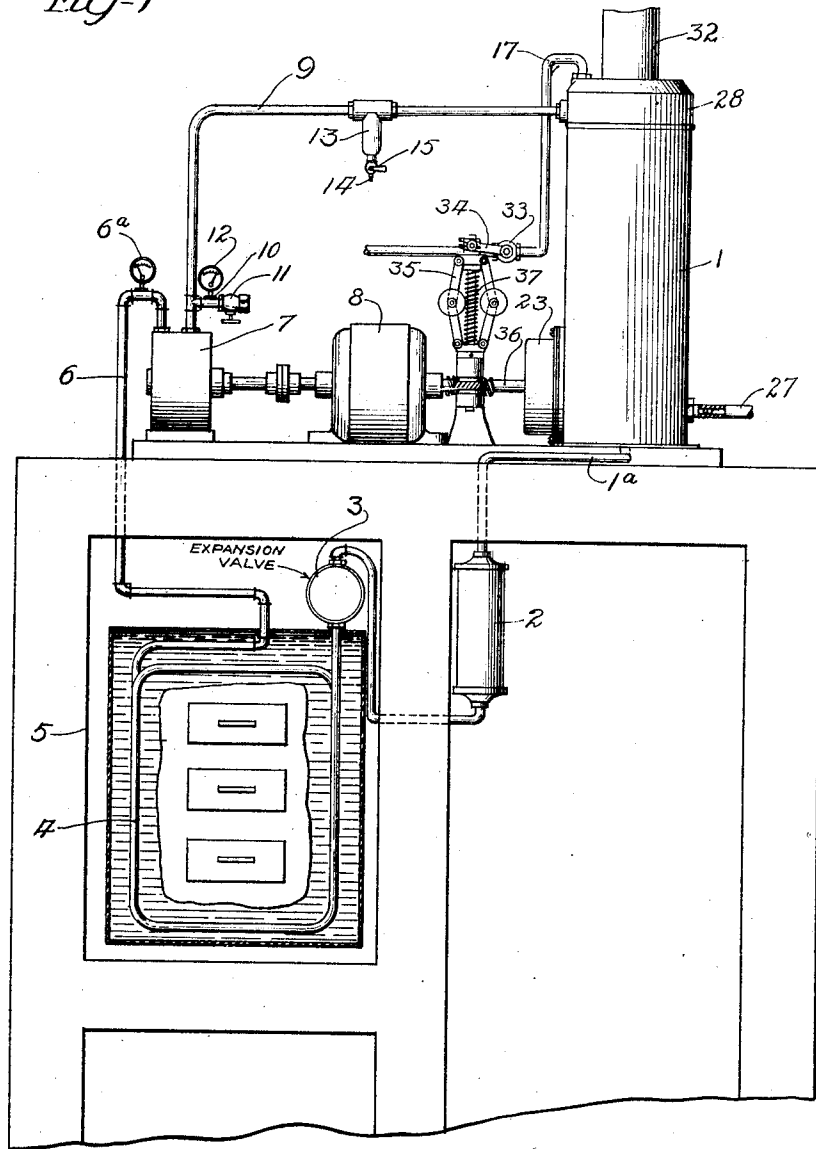
Z. WIRT

1,728,740

CONDENSER

Original Filed Feb. 23, 1922 2 Sheets-Sheet 1

Fig-1



By:-

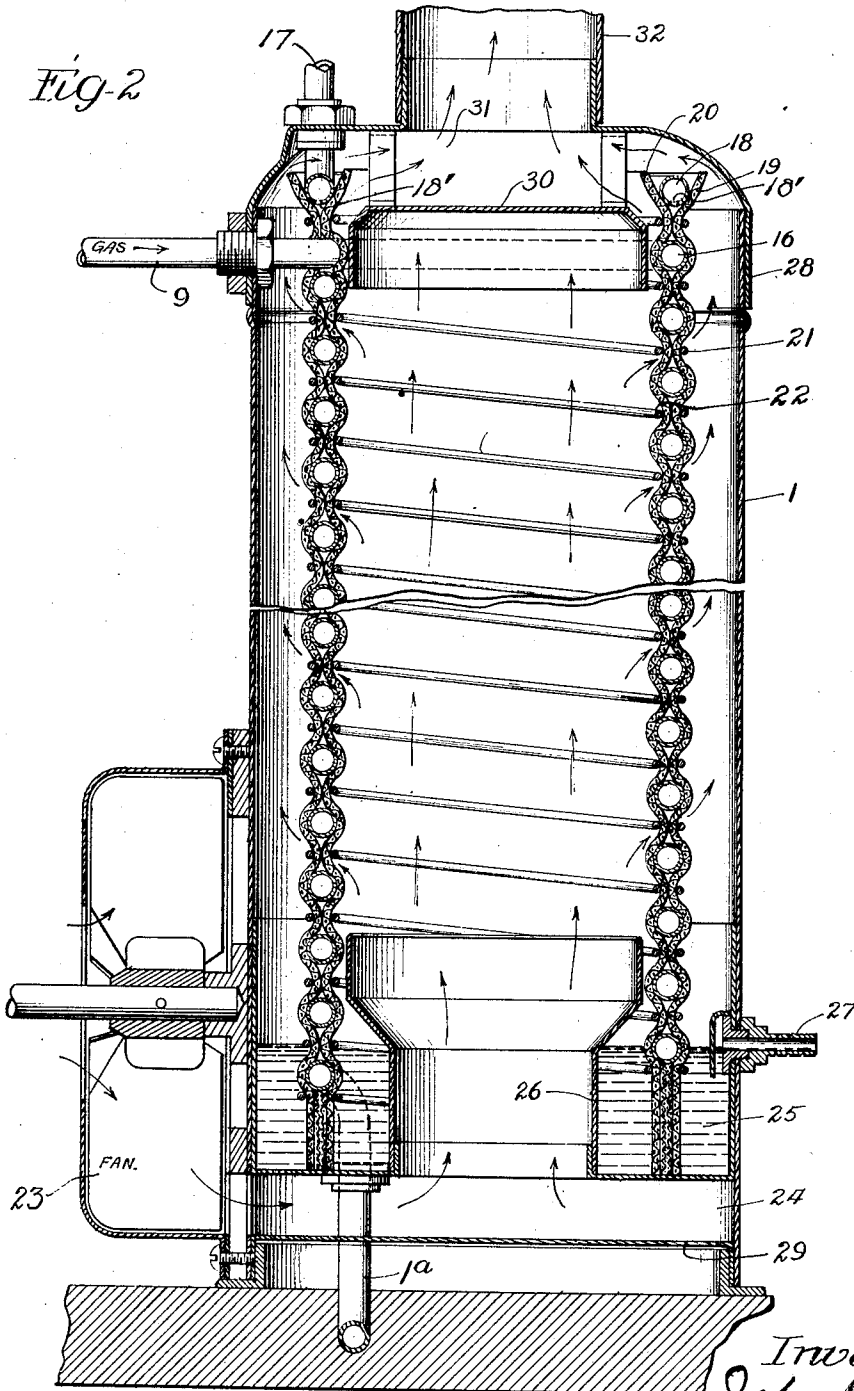
Inventor
Zebulon Wirt
Parker Carter
Atty's

Sept. 17, 1929.

Z. WIRT
CONDENSER

1,728,740

Original Filed Feb. 23, 1922 2 Sheets-Sheet 2



By:-

Inventor:
Zebulon Wirt
Parker & Carter
Attys.

UNITED STATES PATENT OFFICE

ZEBULON WIRT, OF LOS ANGELES, CALIFORNIA, ASSIGNOR OF ONE-FOURTH TO EDWARD CACKLEY, OF OMAHA, NEBRASKA

CONDENSER

Application filed February 23, 1922, Serial No. 538,544. Renewed August 17, 1928.

This invention relates to a new and useful improvement in condensers for use with refrigerating apparatus, and has for its object to provide a new and improved device of this description, particularly adapted to be used for household purposes, which shall be cheap in construction and efficient in operation. The invention has other objects which are more particularly pointed out in the following description.

Referring now to the drawings

Fig. 1 is a view showing one form of apparatus embodying the invention;

Fig. 2 is a sectional view of the condensing device.

Like numerals refer to like parts throughout the several figures.

In carrying out the invention I provide some suitable gas which can be easily liquefied or condensed, and which when converted into a gas will produce the desired cooling effect. I have found that for house boxes sulphur dioxide is very efficient for this purpose. The gas is condensed in the condenser 1, and the liquid then passes through pipe 1^a into the receiver 2, and through the expansion valve 3, and it then passes through a suitable expansion coil or coils 4 where it is again converted into a gas in the refrigerator 5, which may be of any suitable construction and arrangement. The gas then passes through pipe 6 to a compressor 7, which may be of any suitable construction. This compressor is operated by a suitable motor 8. A vacuum gauge 6^a is connected with this pipe 6. A pipe 9 leads from the compressor 7 to the condenser 1. The supply of the refrigerating material may be inserted through the pipe 10, which has a valve 11. A pressure gauge 12 is provided in communication with the pipe 9, so that the pressure can be ascertained. The pipe 9 is provided with a collecting chamber 13 for any foreign material that may be in the gas, and this collecting chamber has a discharge 14, controlled by a valve 15. The pipe 9 enters the condenser 1 and connects with a coil 16 in which the compressed gas is cooled and liquefied. The casing of this condenser is preferably of thin metal.

I provide means for supplying water and evaporating it in proximity to the pipe of the coil 16. In the construction herein shown I provide a water supply pipe 17, which enters the condenser at the top, and which communicates with a coil 18, preferably a single coil, having discharge openings 18' at various points which discharge the water, so that it runs down along an evaporating device consisting of, in this particular instance, pieces of canvas, felt, asbestos or other suitable web like material 19, 20, through which air can pass. These webs are placed on opposite sides of the coil 16, and extend longitudinally, as shown. The water is preferably discharged between the webs 19 and 20 so that it will run down along the coils and wet these webs. These webs may be arranged in various ways, but I prefer to have them in strips, and to hold them in place by means of coils of spring wire 21, 22, located on the outside and inside, as shown in Fig. 2, the coils of the wires being located between the coils of the pipe, and the webs being held in place by the pressure of the coils 21 and 22. Air is forced up around the coils in any suitable manner, as by means of an air moving device which is illustrated as a fan, 23, operated by the motor 8. The fan is preferably mounted directly upon the condenser as shown. This condenser has at the bottom an air chamber 24, which communicates with the fan 23. Above this air chamber is a water chamber 25, and passing through the center of this water chamber is a passageway 26 for the air from the air chamber 24. The water chamber is provided with an outlet 27 for any surplus water. The surplus water from the coil 18 enters the water chamber 25, and the ends of the webs 19 and 20 preferably project into this water chamber so that they will be wet, and they will also act by capillary attraction to draw the water upwardly therealong.

The casing of the condenser is preferably provided with a removable top 28 and a removable bottom 29. The water chamber 25 is separate from the casing and on the inside thereof and is removable, and the coil 18 and associated parts of the casing may also be re-

moved to give access to the parts. By means of this construction the coil can be easily, quickly and cheaply assembled and covered and uncovered as desired.

5 I prefer to provide an obstructing device 30 at the top of the condenser, which prevents the air from passing straight through, and causes it to go through the porous webs 19 and 20. There is an air chamber 31 at the top into which this air passes, and it is then discharged through the discharge 32. This air causes the water on the webs 19 and 20 to be evaporated, and carries the evaporated water out through the discharge, and thus 10 cools the gas in the coil 16. In the condenser the gas is liquefied and the liquid passes into the receiver 2.

I prefer to make the device automatic and to do this I provide some means for automatically turning on and shutting off the water supplied to coil 18. In the construction shown this is accomplished by means of a valve 33 in the pipe 17. This valve is provided with an arm 34 which is connected with a governor 35, operated from the motor shaft 25 36. The parts are arranged so that when the shaft 36 is operating, the governor will move the arm 34 to open the valve and let water into the coil 18. When the motor stops, the governor moves so as to move the arm 34 to close the valve 33 and shut off the water. I prefer to provide a spring 37 to assist this latter movement.

35 I have described in detail a particular construction embodying the invention but it is of course evident that the parts may be varied in many particulars without departing from the spirit of the invention as embodied in the claims hereto appended, and I therefore do not limit myself to the particular construction shown.

The use and operation of my invention are as follows:

45 When the parts are set up ready to operate, the refrigerant is inserted through the pipe 10. The motor 8 is started in operation, and this operates the compressor 7 and opens the valve 33 and admits water to the coil 18. The water then flows down along the evaporating device consisting of the webs 19 and 20. The compressor compresses the gas and forces it through the coil 16. The fan also forces air up through the condenser. This air evaporates the water and cools the coil 16, and the refrigerant therein, and this refrigerant is then condensed and passes through pipe 1^a into the receiver or collector 2. The expansion valve 3 then reduces the pressure so that this liquid is again converted into a gas, and it passes in an expanded and cool condition through the coil 4, where its cooling effect is used in any manner desired. The gas then absorbs heat from the material or articles to be cooled, and passes through pipe 6 to the

compressor 7, and the operation hereinbefore described is continued.

I claim:

1. An article of manufacture comprising a condenser having an outer casing, a coil of pipe in said casing through which the material to be condensed passes, water evaporating material extending as cylindrical walls along the inner and outer faces of said coil, holding means for holding said material in position, a water supplying pipe for supplying water thereto and means for automatically supplying water to said supplying pipe.

2. An article of manufacture comprising a condenser having an outer casing, a coil of pipe in said casing through which the material to be condensed passes, water evaporating material extending longitudinally on the inner and outer faces of said coil, holding means for holding said material in position, a water supplying pipe for supplying water thereto, an air passageway extending along the interior of said coil, and means for forcing the air through said evaporating material before it can be discharged from the condenser.

3. An article of manufacture comprising a condenser having an outer casing, a coil of pipe in said casing, water evaporating material on the inner and outer surfaces of said coil and extending longitudinally therealong, means for supplying water to the water evaporating material, and means for holding said water evaporating material in proper relation to said coil, comprising inner and outer holding coils located between the coils of said pipe and between which said evaporating material is held.

4. An article of manufacture comprising a condenser having an outer casing, a water chamber at the bottom of said casing, a coil of pipe in said casing, water evaporating material on the inner and outer surfaces of said coil and extending longitudinally therealong, means for supplying water to the water evaporating material, the surplus water being deposited in said water receptacle, and means for holding said water evaporating material in proper relation to said coil comprising inner and outer holding coils located between the coils of said pipe and between which said evaporating material is held.

5. An article of manufacture comprising a condenser having an outer casing, a water chamber at the bottom of said casing, a coil of pipe in said casing, water evaporating material on the inner and outer surfaces of said coil and extending longitudinally therealong, means for supplying water to the water evaporating material, the surplus water being deposited in said water receptacle, means for holding said water evaporating material in proper relation to said coil comprising inner and outer holding coils located between the coils of said pipe and between

70

75

80

85

90

95

100

105

110

115

120

125

130

which said evaporating material is held, an air moving device attached to said outer casing, an air chamber at the bottom of said casing communicating with said air moving device, said water receptacle being provided with a centrally located air passageway communicating with said air chamber and extending into the center of said coil.

6. An article of manufacture comprising a condenser having an outer casing, a water chamber at the bottom of said casing, a coil of pipe in said casing, water evaporating material on the inner and outer surfaces of said coil and extending longitudinally therealong, means for supplying water to the water evaporating material, the surplus water being deposited in said water receptacle, means for holding said water evaporating material in proper relation to said coil comprising inner and outer holding coils located between the coils of said pipe and between which said evaporating material is held, an air moving device attached to said outer casing, an air chamber at the bottom of said casing communicating with said air moving device, said water receptacle being provided with a centrally located air passageway communicating with said air chamber and extending into the center of said coil, a discharge at the upper end of said casing, and an air obstructing device between said discharge and said air chamber which causes the air to pass through the evaporating material before escaping from said casing.

Signed at Chicago, county of Cook and State of Illinois, this 15th day of February, 1922.

ZEBULON WIRT.