

FRED W WOLF JUNIOR

By EurIng Brian Roberts, CIBSE Heritage Group

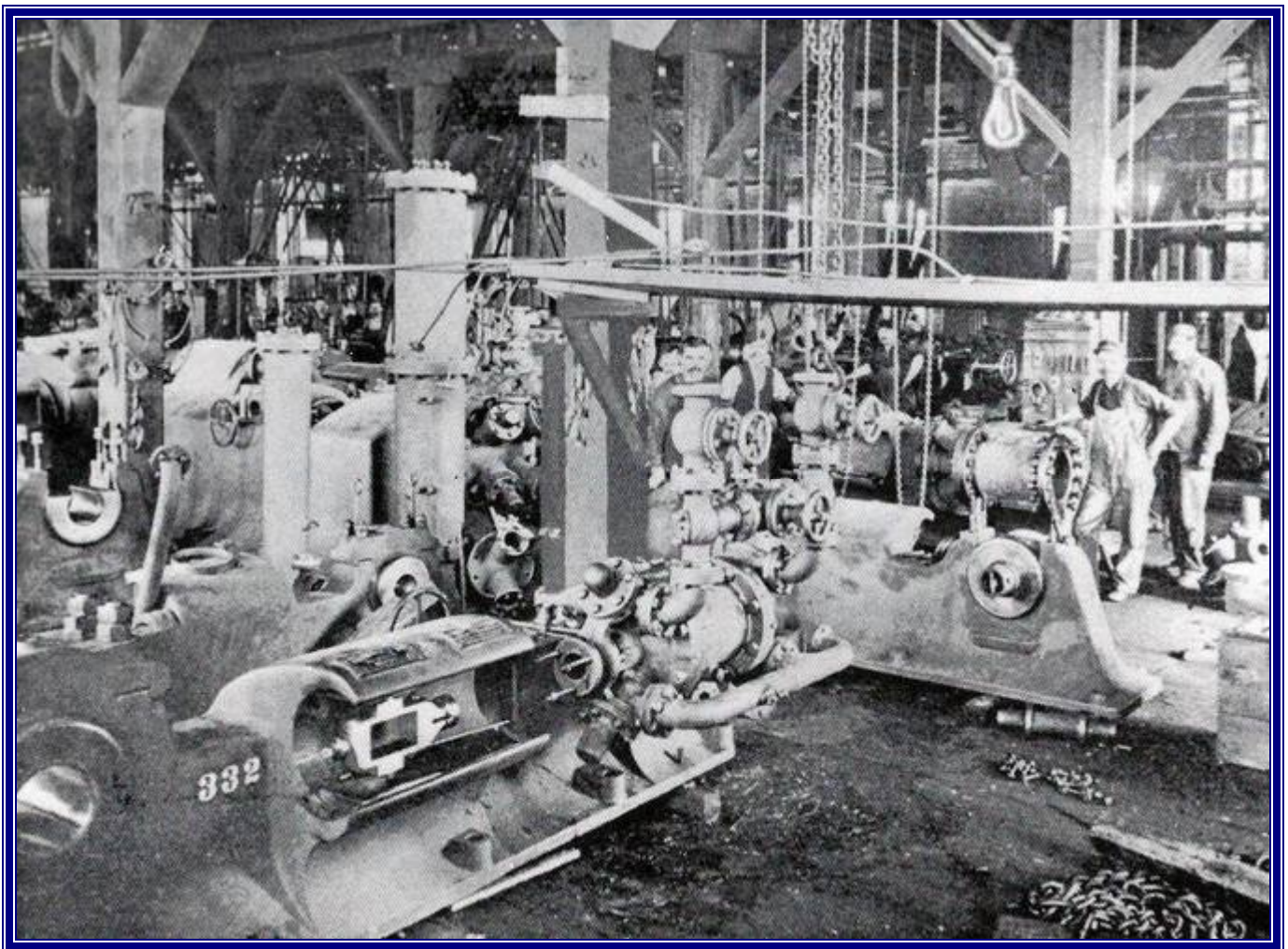


Fred W Wolf Jr, 1879-1954

Fred W Wolf Jr was born on 16 July, 1879, in Chicago. His father was Frederick J Wolf, an early advocate of the German Linde refrigerating system and who, in 1881, secured the rights to manufacture and sell Linde ammonia machines in the US.

Wolf Jr did not pursue his father's interest in large systems, believing there was a significant market opportunity in the development and sale of household refrigerating appliances. Starting in the early 1900's, he went on to patent a number of refrigeration systems and components, including reversing valves. (His patents were generally in the name of Fred W Wolf, while his father's earlier patent of 1890 was granted to Frederick W Wolf). In 1913, his domestic refrigerator was marketed as the DOMELRE: (From **DOM**estic **EL**ectric **RE**frigerator). This was the first attempt to mass-market a simple, inexpensive household refrigerator which was air-cooled, could be plugged into the house electric supply, added to an ordinary ice-box, and which featured ice cube trays. His system was considered so important that in 1917 the Wolf Company was bought out by Packard Motor Company (seeking to diversify). The DOMELRE was renamed ISKO.

Fred Wolf Jr was a Charter Member of ASRE and served on several committees. He died on 19 January, 1954 and was inducted into the ASHRAE Hall of Fame in 2014.



Assembly of Linde horizontal ammonia compressors at the Frederick W Wolf Company, Chicago, c.1891

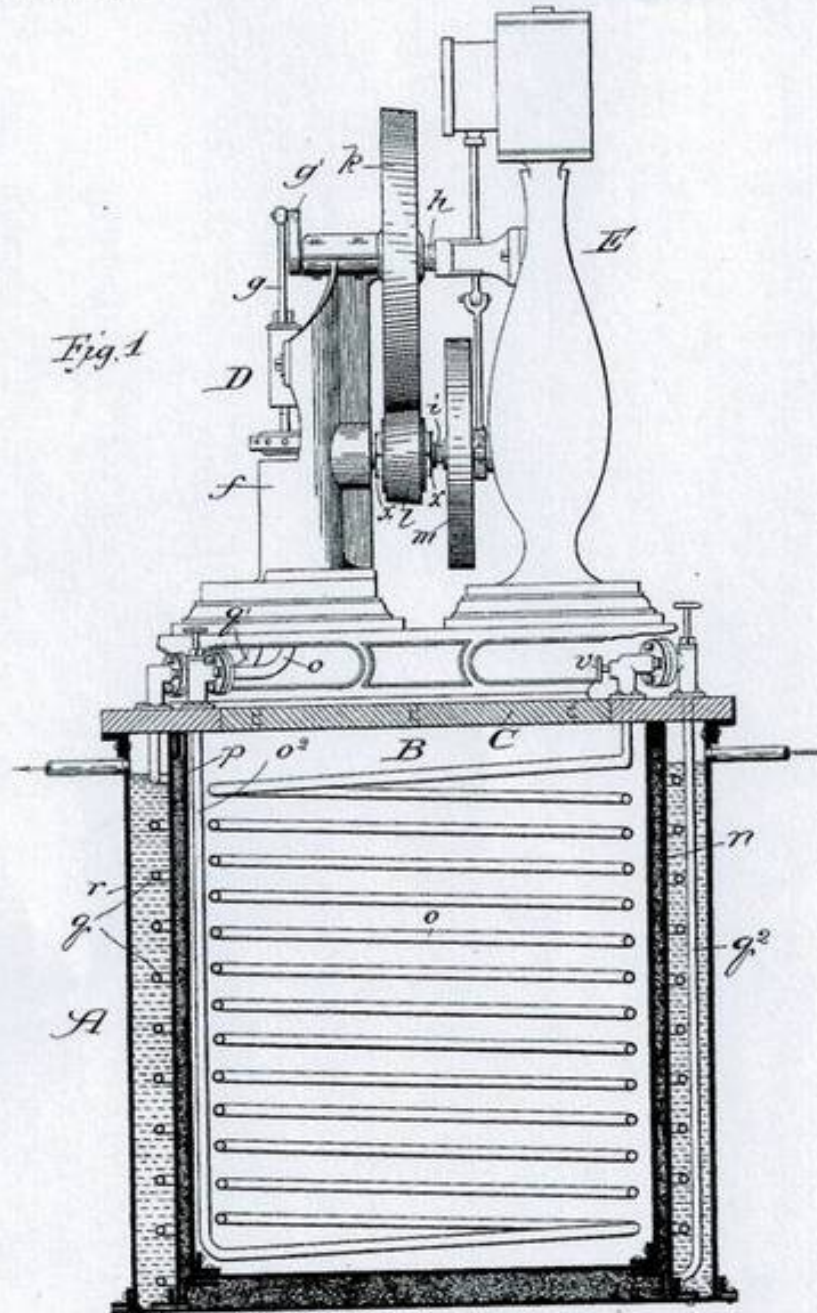
(No Model.)

2 Sheets—Sheet 1.

F. W. WOLF.
ICE OR REFRIGERATING MACHINE.

No. 424,747.

Patented Apr. 1, 1890.



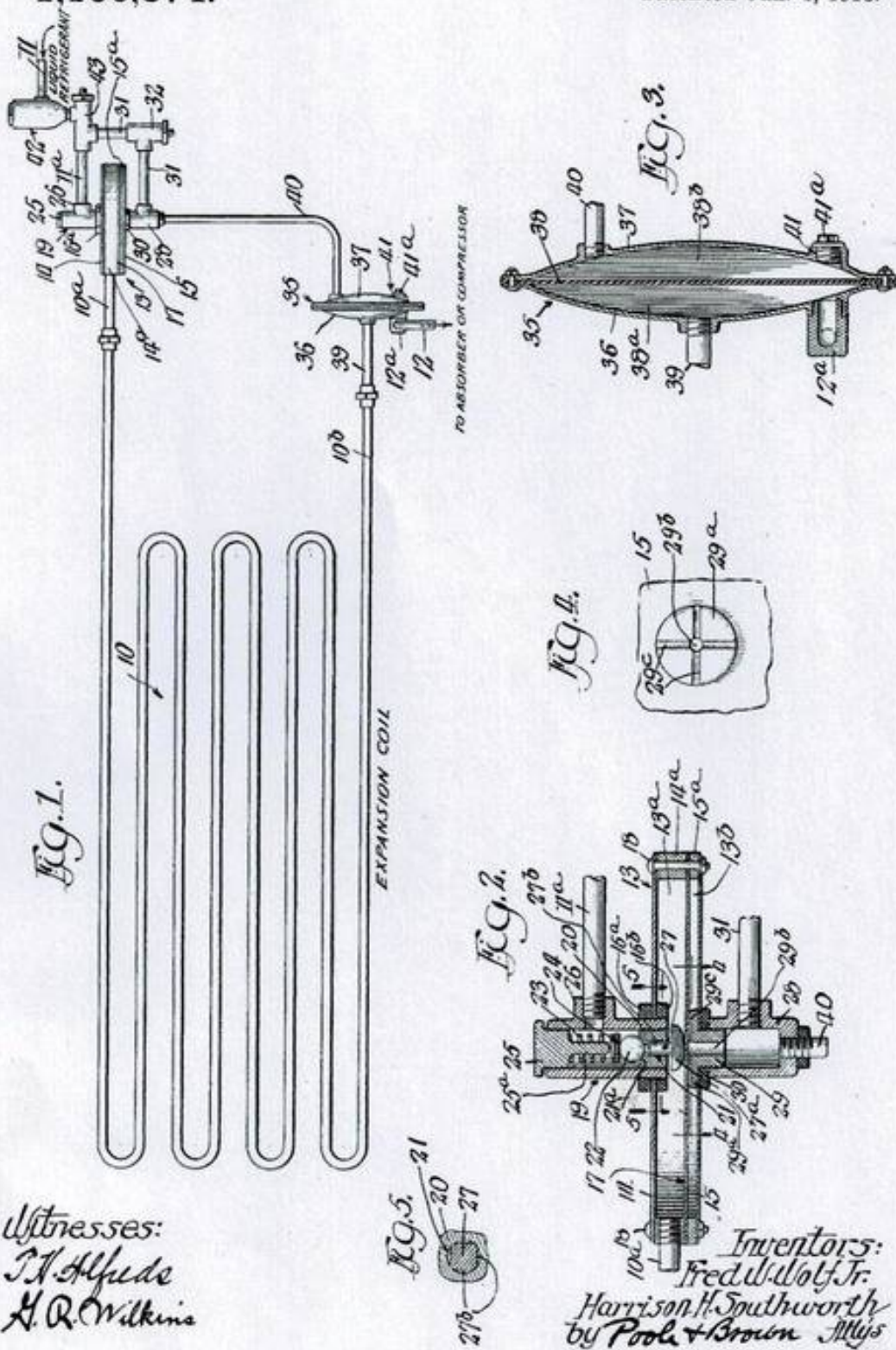
Witnesses:
Carl C. Sanford,
J. W. Sanford

Inventor:
Frederick W. Wolf,
By Dymally & Dymally
Attorneys

F. W. WOLF, JR. & H. H. SOUTHWORTH.
 VALVE CONTROL MECHANISM FOR REFRIGERATING APPARATUS.
 APPLICATION FILED JAN. 16, 1912.

1,166,874.

Patented Jan. 4, 1916.



Witnesses:
 J. H. Alfede
 H. R. Wilkins

Inventors:
 Fred W. Wolf Jr.
 Harrison H. Southworth
 by Pool & Brown Attys

UNITED STATES PATENT OFFICE.

FRED W. WOLF, JR., AND HARRISON H. SOUTHWORTH, OF CLEVELAND, OHIO,
ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE ICELESS MACHINE COMPANY,
OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

VALVE-CONTROL MECHANISM FOR REFRIGERATING APPARATUS.

1,166,874.

Specification of Letters Patent.

Patented Jan. 4, 1916.

Application filed January 16, 1912. Serial No. 671,446.

To all whom it may concern:

Be it known that we, FRED W. WOLF, JR., and HARRISON H. SOUTHWORTH, citizens of the United States, and residents of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Valve-Control Mechanism for Refrigerating Apparatus; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a device for automatically controlling the supply of the refrigerating medium to the evaporating and expansion coil, or, as it is generally called, the refrigerating or freezing coil, of a refrigerating apparatus, and consists of the matters hereinafter described and more particularly pointed out in the appended claims.

As is well known, in a refrigerating apparatus, the refrigerating medium, usually ammonia, is supplied to the refrigerating coils from a receiver containing liquid ammonia under high pressure. The passage of the ammonia from the liquid receiver to the refrigerating coil is ordinarily controlled by what is usually called an expansion valve, through which the liquid ammonia is allowed to pass in small quantities. Said liquid ammonia after it has passed the valve and under the low pressure on the side of the valve toward the refrigerating coils, slowly boils, and the mixed vaporous and liquid ammonia passes into and through the refrigerating coils during the operation of the apparatus.

If, during the operation of the apparatus, the escape of ammonia through the expansion valve is cut off entirely for any substantial length of time, the ammonia in the refrigerating coil will gradually be exhausted, the vaporization and expansion of the vapor through the coil will diminish and finally cease, and the coil continuing to acquire heat from the atmosphere or other fluid surrounding it, as for example the air in the box wherein it is located, will lose less and less of this acquired heat to the ammonia passing through it, and will gradually rise in temperature. If the valve is

then again opened, liquid ammonia will pass through the valve as before, and, vaporizing and expanding as it passes through the refrigerating coil, will again lower the temperature of said coil. It is thus apparent that the temperature of the surrounding medium varies with the flow of the ammonia in the coil, and therefore, having a coil of given size capable of a constant heat absorption at a predetermined rate, the temperature of the fluid or atmosphere surrounding said coil, may be accurately controlled by means of the valve which determines the flow of liquid ammonia into the expansion or refrigerating coil.

The object of our invention is to provide a mechanism for automatically controlling the valve which admits liquid ammonia to the refrigerating coil, the rate at which said ammonia is allowed to pass being determined by the temperature of the fluid surrounding said coil so that only such an amount of liquid ammonia will be allowed to pass into the coil as will maintain, by its vaporization and expansion through the coil, a certain predetermined temperature in the atmosphere or fluid surrounding the coil.

In the drawings Figure 1 is a view in side elevation showing our improved controlling device in connection with a set of expansion or refrigerating coils; Fig. 2 is a view on an enlarged scale representing a vertical section through a part of the controlling device; Fig. 3 is a view representing a vertical section through another part of the device; Fig. 4 is a fragmentary view representing a top plan of the parts below the horizontal plane of the line 4-4 of Fig. 2; Fig. 5 is a view representing a partial transverse section through Fig. 2 in a plane indicated by the line 5-5 thereof.

Referring now to that embodiment of our invention illustrated in the drawings, 10 indicates diagrammatically an expansion or refrigerating coil; 11, a pipe leading from a receiver containing liquid anhydrous ammonia under pressure (not shown); and 12 indicates a pipe adapted to lead the ammonia gas after it has done its work in the refrigerating coil back to the apparatus in which it is again converted to liquid form. 13 indicates a casing inclosing upper and lower chambers 13^a, 13^b which are separated by a thin sheet metal diaphragm 17. As

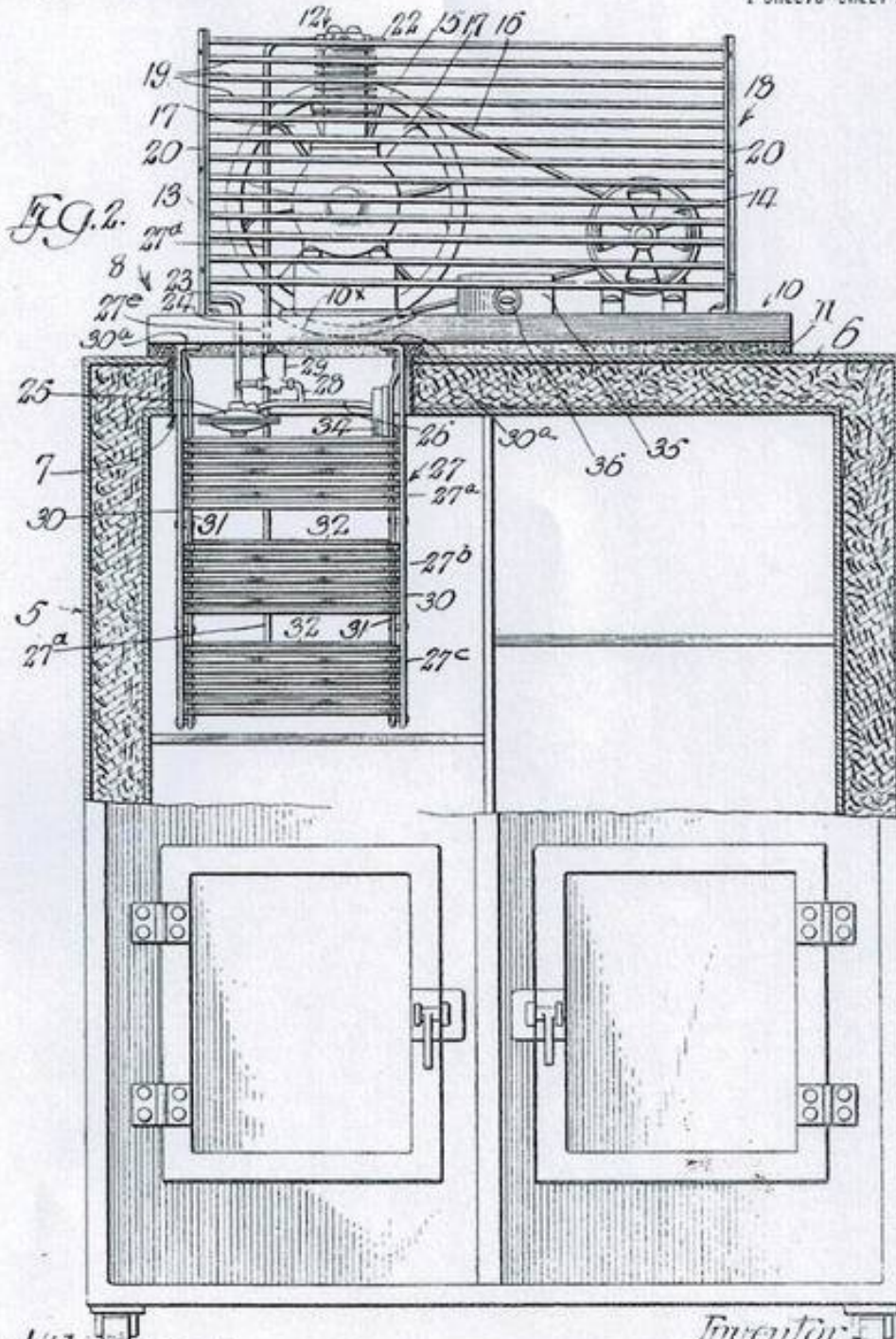
F. W. WOLF.
REFRIGERATING APPARATUS.

APPLICATION FILED MAY 9, 1914. RENEWED JUNE 9, 1916.

1,222,170.

Patented Apr. 10, 1917.

2 SHEETS—SHEET 2.



Witnesses:
J. H. Hollender
W. M. Hall.

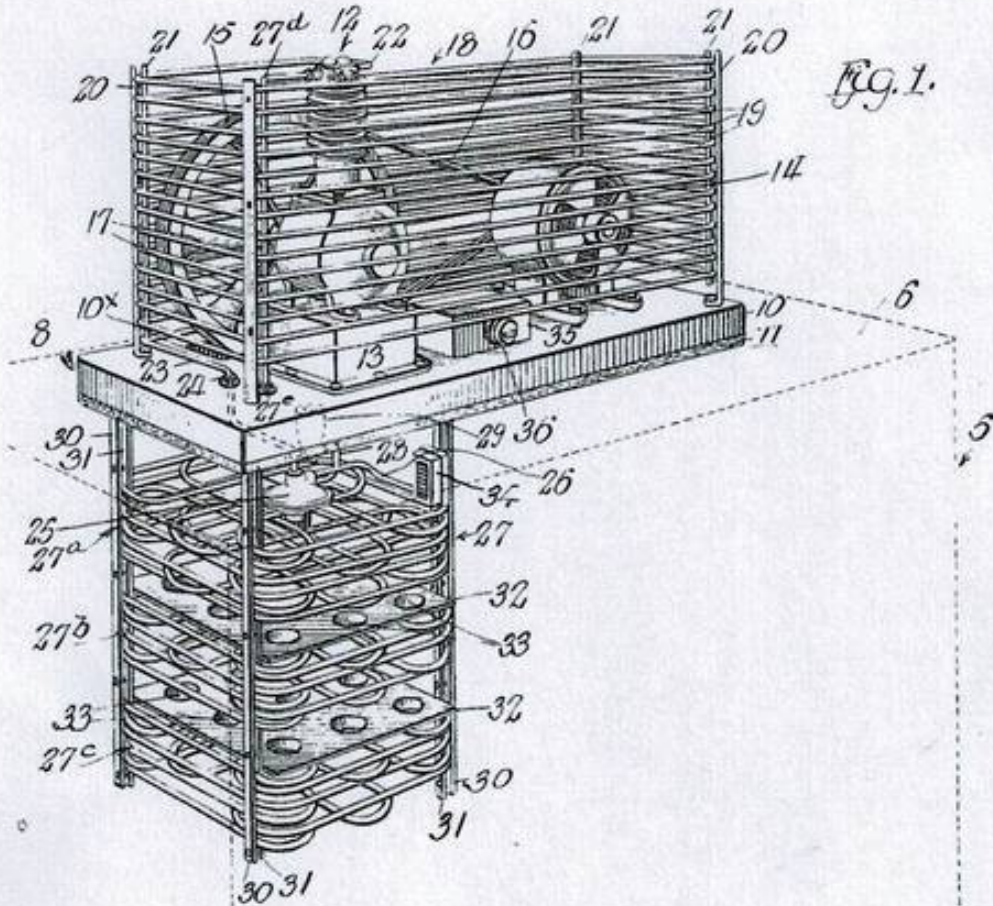
Inventor:
Fred W. Wolf
by Armond Wellhope, atty.

F. W. WOLF.
 REFRIGERATING APPARATUS.
 APPLICATION FILED MAY 9, 1914. RENEWED JUNE 9, 1916.

1,222,170.

Patented Apr. 10, 1917.

2 SHEETS—SHEET 1.



Witnesses:
 E. H. Alfuda
 W. A. Dall

Inventor
 Fred W. Wolf
 by Brown & McElroy Attys

UNITED STATES PATENT OFFICE.

FRED W. WOLF, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO ISKO, INCORPORATED, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

REFRIGERATING APPARATUS.

1,222,170.

Specification of Letters Patent.

Patented Apr. 10, 1917.

Application filed May 9, 1914, Serial No. 837,500. Renewed June 9, 1916. Serial No. 102,804.

To all whom it may concern:

Be it known that I, FRED W. WOLF, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Refrigerating Apparatus; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in refrigerating apparatus, and more particularly to refrigerating apparatus of the compression type and consists of the matters hereinafter described and pointed out in the appended claims.

The object of the invention is to provide a refrigerating unit, more particularly intended for domestic use, which is adapted to be applied to any of the usual refrigerators by simply cutting an opening in the top wall of the refrigerator for the reception of the expansion coil.

The particular type of refrigerating apparatus embodied in my invention as shown herein is such as that described in an application filed by me on the 23rd day of December, 1913, Serial No. 808,389. The many uses of my improved refrigerating unit will appear as I proceed with my specification.

In the drawings:

Figure 1 represents a perspective view of a unitary refrigerating apparatus, made in accordance with my invention.

Fig. 2 is a view representing a refrigerator of the domestic type, partly in elevation, and partly in section, with my unitary refrigerating apparatus in position thereon, to cool the interior of the same.

Referring now to that embodiment of my invention illustrated in the accompanying drawings: 5 indicates as a whole a refrigerator, preferably of the domestic type, which may be of any suitable material and construction. As shown, the top wall 6 of said refrigerator is provided with an aperture or opening 7 therethrough.

8 indicates, as a whole, my improved unitary refrigerating apparatus. Said apparatus comprises primarily a base or support 10 which is adapted to rest upon the top

wall of the refrigerator and to cover the opening 7 therein. The said base 10 is preferably made of wood and rectangular in form and generally longer than it is wide, and is provided in its bottom side with a sheet of felt or like material 11, which may be attached thereto in any suitable manner. Said felt effectually seals the interior of the box and absorbs any vibrations which might occur, thus reducing to a minimum the objectionable sounds which might be caused by vibration due to the moving of the various parts.

Mounted on the base 10 and toward one end thereof, is located an upright compressor 12 fixed to a block or standard 13 which is rigidly attached to said base 10. Near the other end of said base 10 is located a motor 14 for driving said compressor. A driven pulley adapted for the operation of the compressor 12, which pulley is operatively connected by means of one or more belts 16 to the motor 14. Said pulley 15 is of comparatively large diameter, and to accommodate the same, a pit 10^a is formed in the base 10 in the vertical plane of said pulley, into which the bottom of the pulley extends. The wheel 15 is made heavy to act as a fly wheel and preferably the spokes 17 thereof are constructed to form fan-like spiral blades which act when the fly wheel is rotated to produce a current of air over the top of the refrigerator, effecting a continual change in the atmosphere surrounding the same.

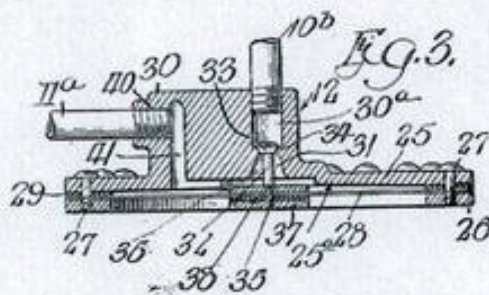
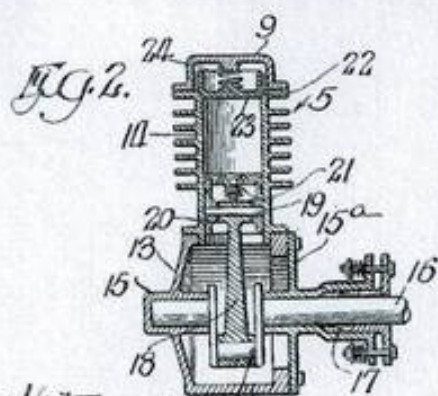
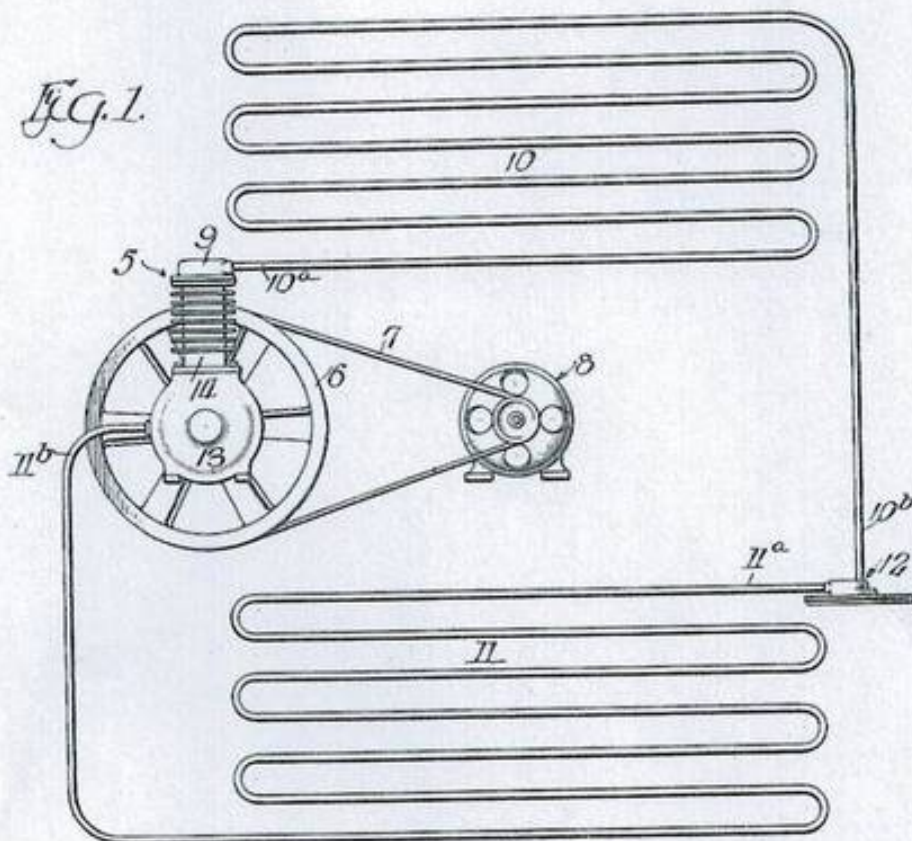
18 indicates, as a whole, the condensing coil. Said coil is made of tubing of a comparatively small cross section and of a comparatively thin wall, and comprises a plurality of vertically spaced, horizontally disposed loops 19, which approximate in size and form the plan of the base 10. Said loops occupy a maximum of horizontal space without extending beyond the edges of said base.

The loops may be supported from the base in any suitable manner, but, as illustrated, are attached to upright bars 20 located near the corners of the base 10 on the outside of said coils at the corners thereof, the lower ends of said bars being bent to form feet by means of which said bars are attached to said base 10. The loops are held

F. W. WOLF.
 PROCESS OF AND APPARATUS FOR REFRIGERATION.
 APPLICATION FILED APR. 8, 1916.

1,291,334.

Patented Jan. 14, 1919.



Witnesses:
 J. H. Alfuda
 Karl W. Dall.

Inventor:
 Fred W. Wolf
 by Brooks McKelvey Attys

UNITED STATES PATENT OFFICE.

FRED W. WOLF, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE
ISKO COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

PROCESS OF AND APPARATUS FOR REFRIGERATION.

1,291,334.

Specification of Letters Patent. Patented Jan. 14, 1919.

Application filed April 8, 1916. Serial No. 89,770.

To all whom it may concern:

Be it known that I, FRED W. WOLF, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Processes of and Apparatus for Refrigeration, and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an improved method of refrigeration and to an apparatus for carrying out said method and consists of the matters hereinafter described and more particularly pointed out in the appended claims.

The improved method is carried on in an apparatus of the compression type as distinguished from absorption systems and includes the usual compressor, a condenser, an expansion chamber and a reducing valve connecting the condenser with the expansion chamber. The improved method and apparatus are primarily intended for small units capable of use for domestic purposes and the object of the invention is to obviate the essential defects and disadvantages to be found in all compression systems as manufactured for refrigeration on a large scale or for the manufacture of ice for commercial purposes.

One disadvantage which is found in the compression system results from the leakage at the stuffing box in the compressor which is the one opening connecting the interior of the refrigerating apparatus with the outside air. If the apparatus is designed to run in pressure, a leak in the stuffing box results in a gradual loss of the refrigerant. If the machine is designed to run in vacuum, there is a leakage of air and of the moisture carried thereby into the apparatus through the stuffing box, with a resulting loss of the efficiency of the apparatus. These disadvantages are not of serious moment in large systems when an engineer is employed to look after the apparatus and attend to the stuffing box, but in a small, automatically controlled apparatus, a tendency to leak in the stuffing box is prohibitive of its use.

Another disadvantage of any refrigerating apparatus when applying it to domestic use is the necessity for cooling water to cool the condenser. There is not only the expense involved but also the cumbersomeness of the apparatus required for cooling, the difficulty in the control of the cooling water and of its final disposal.

My new refrigeration system and process are designed to do away with both of these difficulties, dispensing with the necessity for the use of cooling water on the one hand and preventing either an inward or outward flow through the stuffing box on the other hand.

In carrying out my invention I make use of an expansion valve which is controlled by the pressure of the atmosphere, thus maintaining the low pressure side of the system at a pressure substantially equal to that of the atmosphere no matter at what altitude the system is used nor how said pressure varies under varying climatic or barometric conditions. Since the pressure in the stuffing box is the same as that of the atmosphere, there is no tendency either for the outside air to flow through the stuffing box into the system or for the refrigerant to escape through the stuffing box into the outer air. Such an arrangement also has the added advantage that no adjustment of the valve is necessary, and the objections due to the use of springs, weights or like adjusting devices in the apparatus is entirely done away with.

In addition I select a refrigerant which boils at atmospheric pressure at a sufficiently low degree below the freezing point to produce the temperature required in the ordinary domestic refrigerator at atmospheric pressure. A refrigerant boiling at about 14 to 15 degrees above zero F. at the pressure of atmosphere at sea level gives the best results. I have found that a most satisfactory and in fact the preferred refrigerant for the purpose is sulfur dioxide which boils at atmospheric pressure at 14° Fahrenheit.

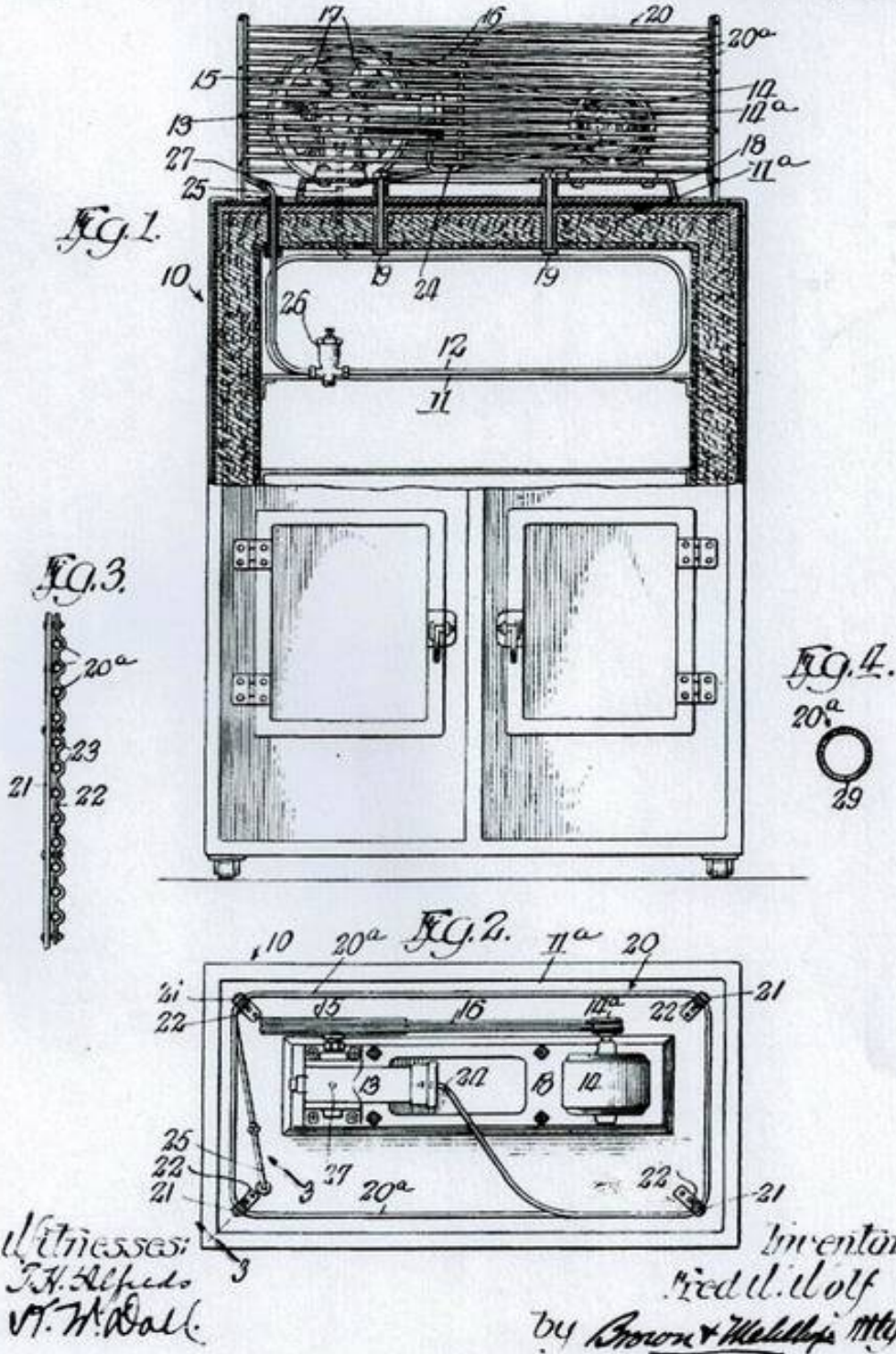
Since the expansion valve is controlled by atmospheric pressure, the pressure in the condenser and its corresponding temperature are immaterial.

In the accompanying drawings, I have illustrated diagrammatically an apparatus

F. W. WOLF.
 PROCESS OF AND APPARATUS FOR REFRIGERATING.
 APPLICATION FILED DEC. 23, 1913. RENEWED DEC. 1, 1916.

1,337,175.

Patented Apr. 13, 1920.



Witnesses:
 J. H. Phelps
 W. H. Wall

Inventor:
 Fred W. Wolf
 by Amos & Melville Attys

UNITED STATES PATENT OFFICE.

FRED W. WOLF, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE ISKO COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF DELAWARE.

PROCESS OF AND APPARATUS FOR REFRIGERATING.

1,337,175.

Specification of Letters Patent.

Patented Apr. 13, 1920.

Application filed December 23, 1913, Serial No. 808,389. Renewed December 1, 1916. Serial No. 134,502.

To all whom it may concern:

Be it known that I, FRED W. WOLF, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Processes of and Apparatus for Refrigerating; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to refrigeration and particularly to processes and apparatus involving compression of the refrigerant as distinguished from absorption systems.

The invention is primarily intended to be used for domestic purposes and one of the objects is to obviate the various defects and disadvantages to be found in prior systems as used for refrigeration on a large scale or for the manufacture of ice in commercial quantities.

One of the disadvantages of prior compression systems is in the cooling of the refrigerant. Where running water is used to cool the condenser there is not only the expense involved in the installation and upkeep but the apparatus including the plumbing is very cumbersome and considerable difficulty is experienced in properly controlling the feed and disposal of the water, particularly if the pressure varies in the supply mains as is nearly always the case.

The present invention overcomes this serious disadvantage and it consists generally, in the use of a refrigerant of low boiling point such as sulfurous acid (SO_2), compressing such refrigerant and delivering it to a receiver, then cooling the refrigerant to something above the temperature of the air surrounding the receiver, and finally expanding the refrigerant to produce a refrigerating effect. By using sulfurous acid as suggested above and providing a large superficial area in the condensing coil, the refrigerant may be condensed and liquefied by exposing the coils to the air only and the use of cooling water is dispensed with.

The invention is further embodied in an

apparatus for carrying out the process, and an illustrative form of such apparatus is shown in the drawings which form a part of this specification, and in which:

Figure 1 is a view of a refrigerating apparatus built in accordance with this invention shown as applied to a domestic type refrigerator, the latter being partly in section;

Fig. 2 is a plan view of the refrigerator and apparatus shown in Fig. 1;

Fig. 3 is an enlarged sectional view through the condensing coil on the line 3--3 of Fig. 2; and

Fig. 4 is a view on a still larger scale representing a cross section of the tubing forming the condensing coil.

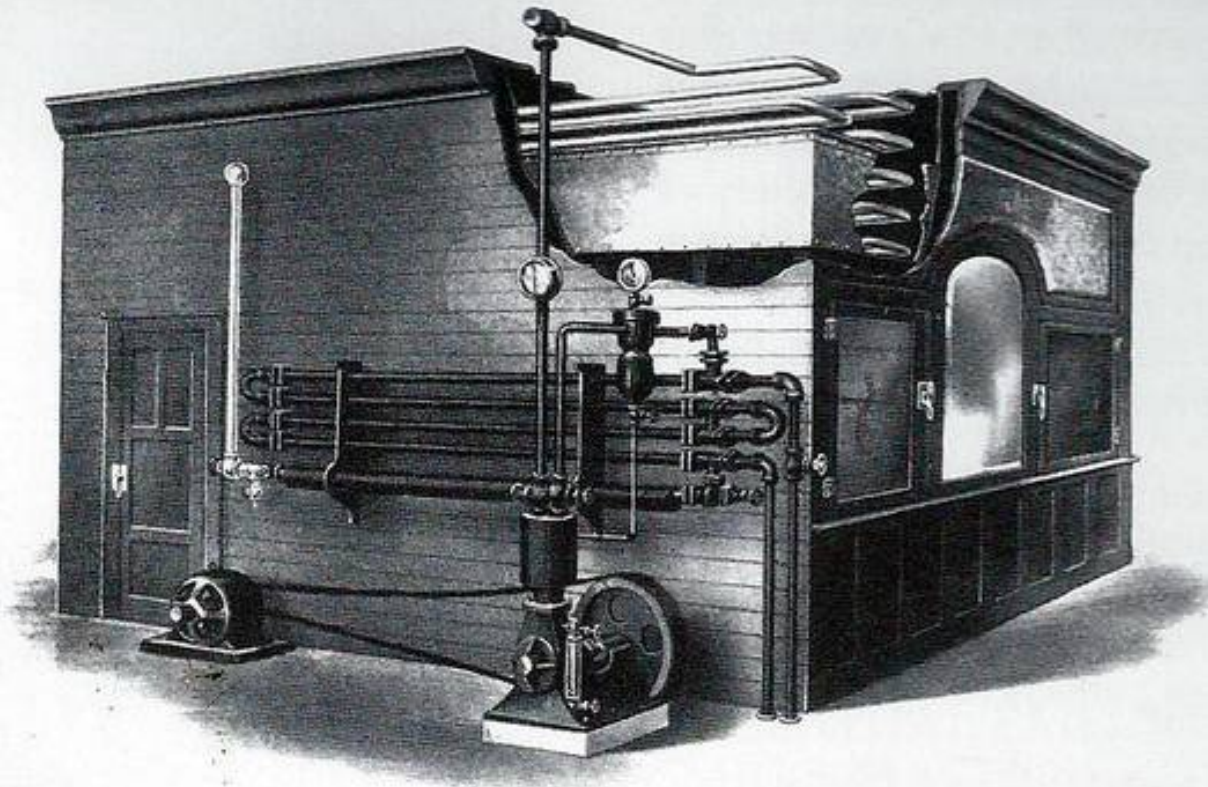
In the drawings, 10 indicates a refrigerator which may be of any desirable construction, having a shelf 11 at the top to support an expansion coil 12. 13 indicates a compressor mounted on the top wall 11^a of the refrigerator near one end thereof, and 14 a motor for driving said compressor mounted on said top wall near the other end thereof. 15 indicates a driven pulley adapted for the operation of the compressor. Said pulley is connected by one or more belts 16 to a driving pulley 14^a on the shaft of the motor 14. The belts are preferably round in section and both the driven pulley 15 on the compressor and the driving pulley 14^a on the motor have suitable peripheral grooves to receive said belts.

The driven pulley 15 is made heavy so as to act also as a flywheel and preferably has spokes 17 constructed to form fan-like, spiral blades which act to produce a draft over the top of the refrigerator and effect a continual change of the air in and about the apparatus thereon. The compressor and the motor, as shown, are mounted on a common, hollow base 18 which is attached by suitable bolts 19 to the top wall 11^a of the refrigerator.

A condensing coil adapted for air cooling is indicated at 20. It comprises a considerable length of tubing, having a comparatively small cross section and a comparatively thin wall to obtain maximum cooling. I have found that the best results are obtained by using copper tubing of about

"In Mechanics, the Supreme Excellence is Simplicity."

James Watt.



Motor driven 2½ ton plant, capable of uniform temperature operating 10 hours per day.

Operating Instructions:

To Start
Turn on the water
Start the motor
Open the liquor valve

To Stop
Close the liquor valve
Stop the motor
Turn off the water

Simple, Eh!

FRED W. WOLF, JR.

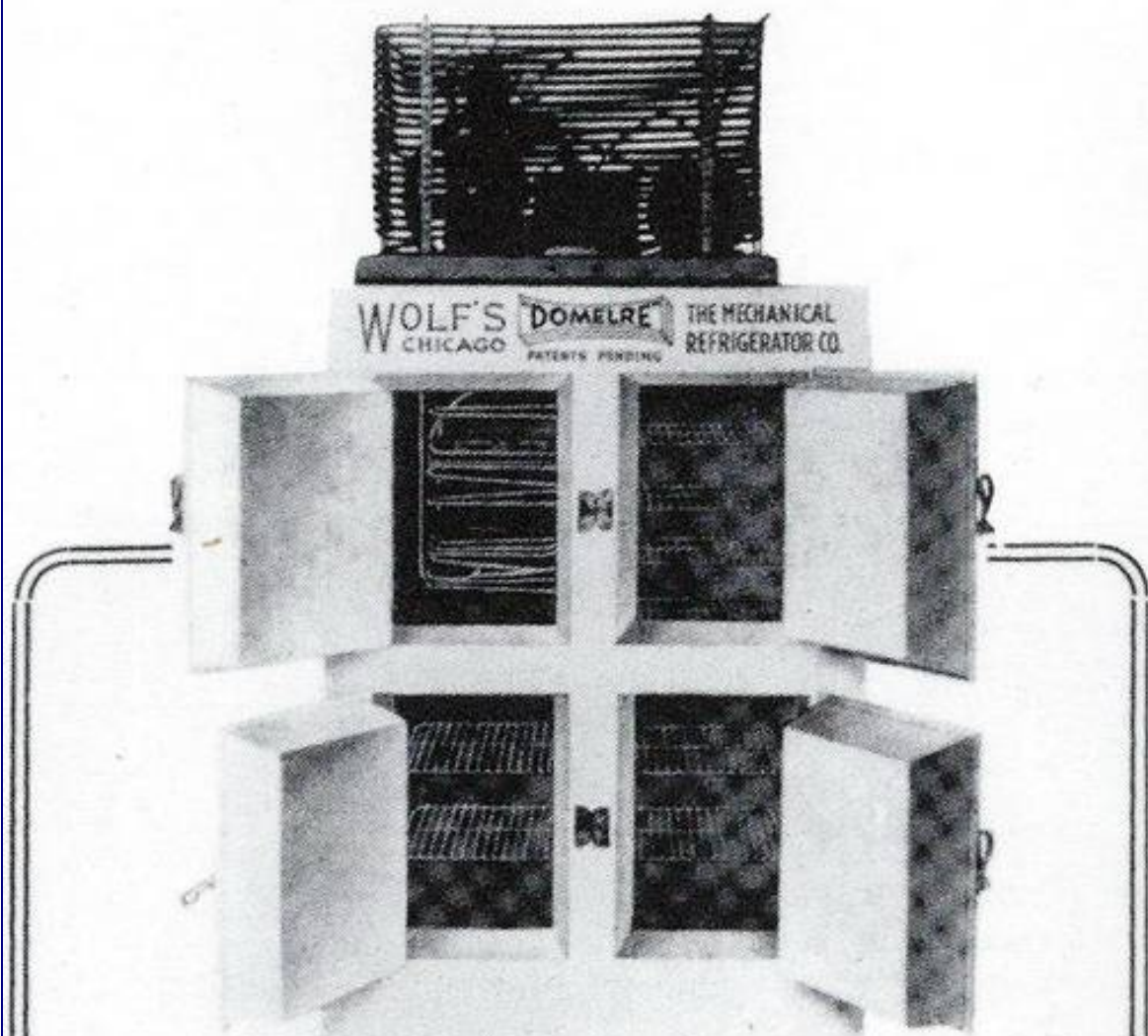
Re-Sale Manufacturer

141 REES STREET

CHICAGO, U. S. A.

SOLD BY

*Hundreds of Jobbers, Contractors, Exporters, Supply Houses, Plumbers,
Utility Companies all over the world.*



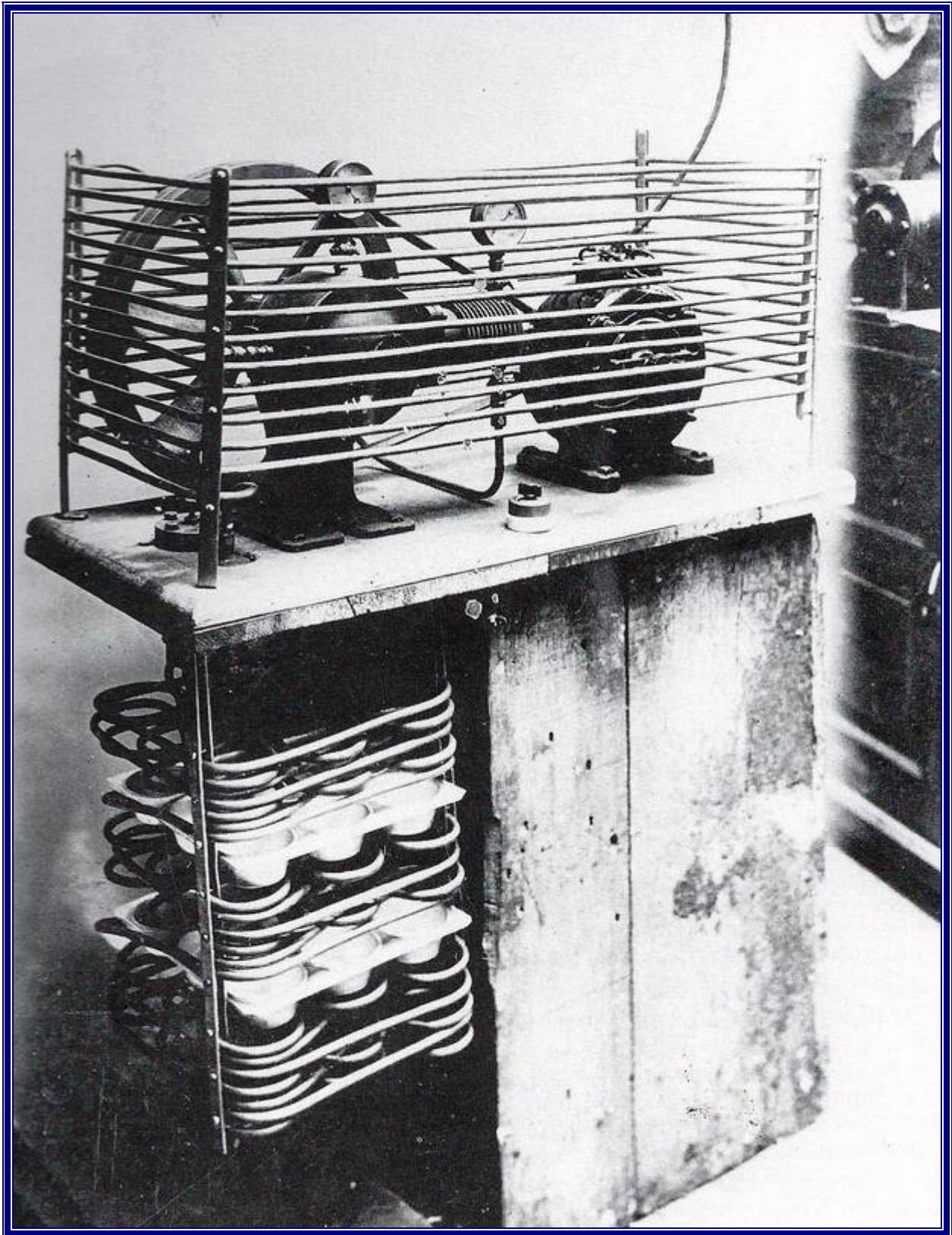
Domestic Electric Refrigerator

Popular Priced and Ready to Run
"Domelre" can be put on any refrigerator

You turn the Switch and "DOMELRE" Does the Rest

Write for Full Particulars

Fred W. Wolf, 1740 Greenleaf Avenue
CHICAGO



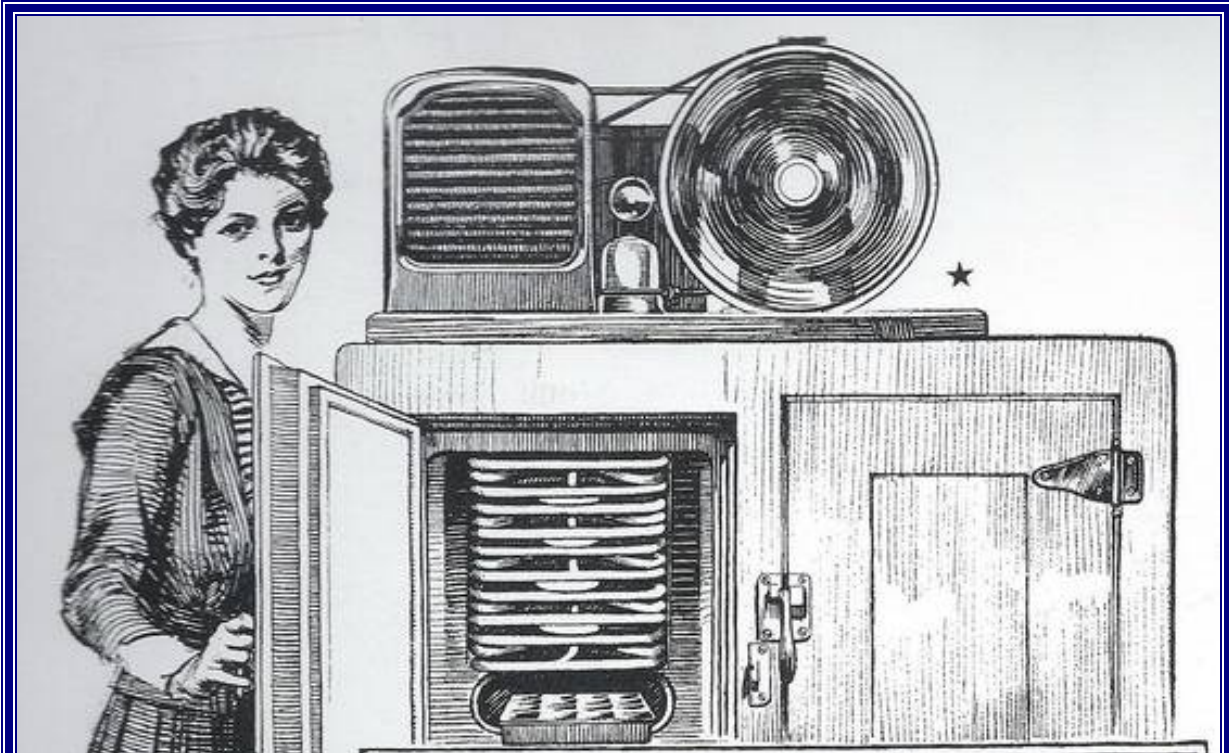
The ¼ hp DOMERLE refrigerator with Sulphur Dioxide as the refrigerant, c.1914



The ice-cube tray of the DOMELRE (based on muffin baking tins): Smithsonian Institution




Isko Share Certificate of 1921



Here, at last—efficient home refrigeration—electric cold storage in your kitchen *now!* Just when all American women face the need of saving every ounce of food, the new model Isko is *ready* to reduce waste and spoilage at their ice-box source. A simple, electric unit, easily installed on a refrigerator, Isko keeps milk, cream, butter, meat and fruits so cold and dry *continuously* that the germ life responsible for decay is paralyzed. Protects your family's health—prevents food poisoning—eliminates the ice-man—freezes ice-cubes and desserts for your table—runs itself. Price, \$275 at Detroit. See "the electric ice-man" at the Isko store in your city—or write to Isko, Inc., Detroit, for booklet "G."

Ice by wire



ISKO advertisement from *Good Housekeeping*, 1917

References

Heat & Cold: Mastering the Great Indoors, Barry Donaldson & Bernard Nagengast, ASHRAE, 1994

Fred W Wolf Jr, ASHRAE Hall of Fame, 2005