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W. D. McCLELLAN

2,024,977

REFRIGERATOR

Filed Jan. 31, 1931

Fig. 1.

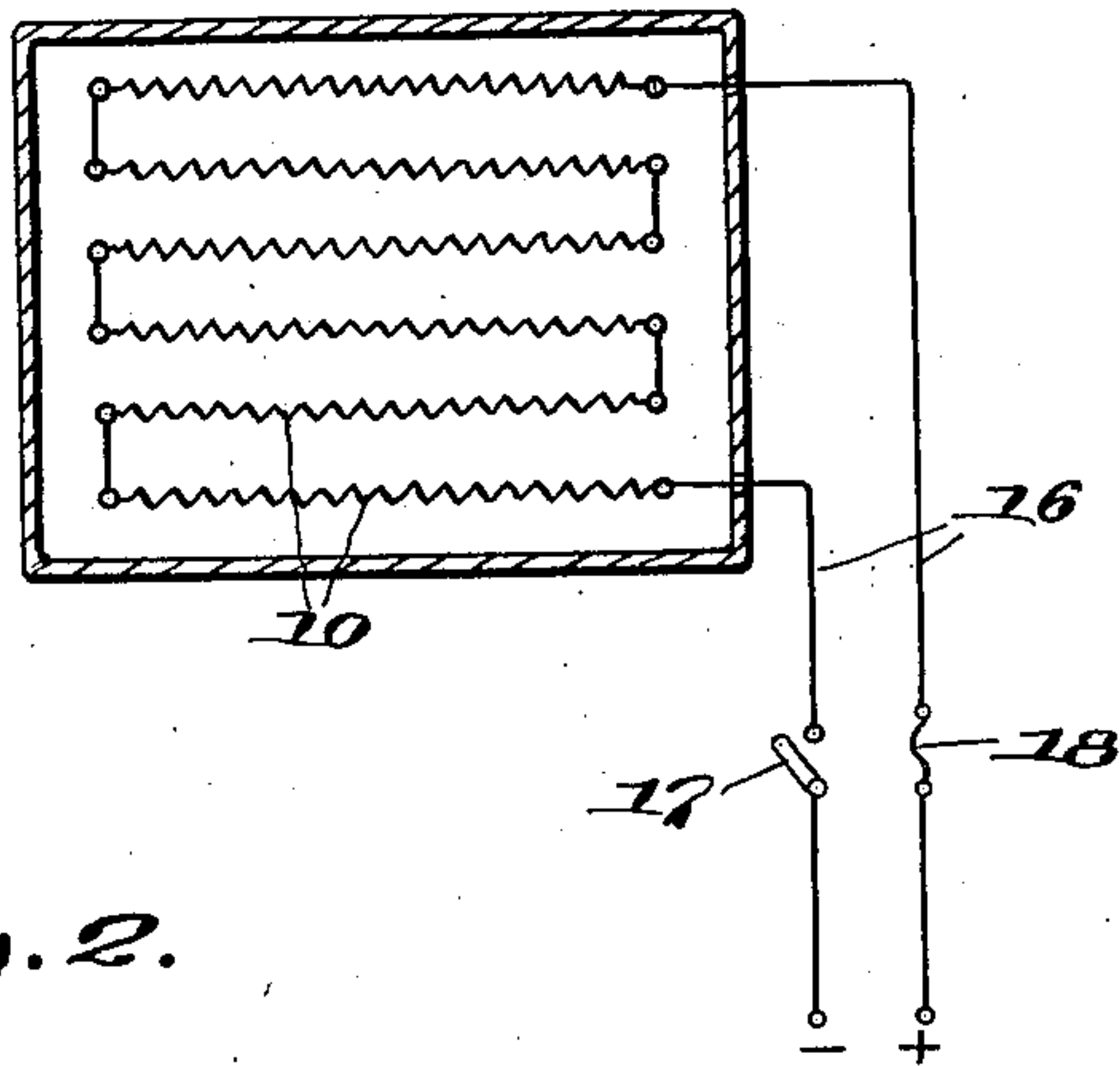


Fig. 3.

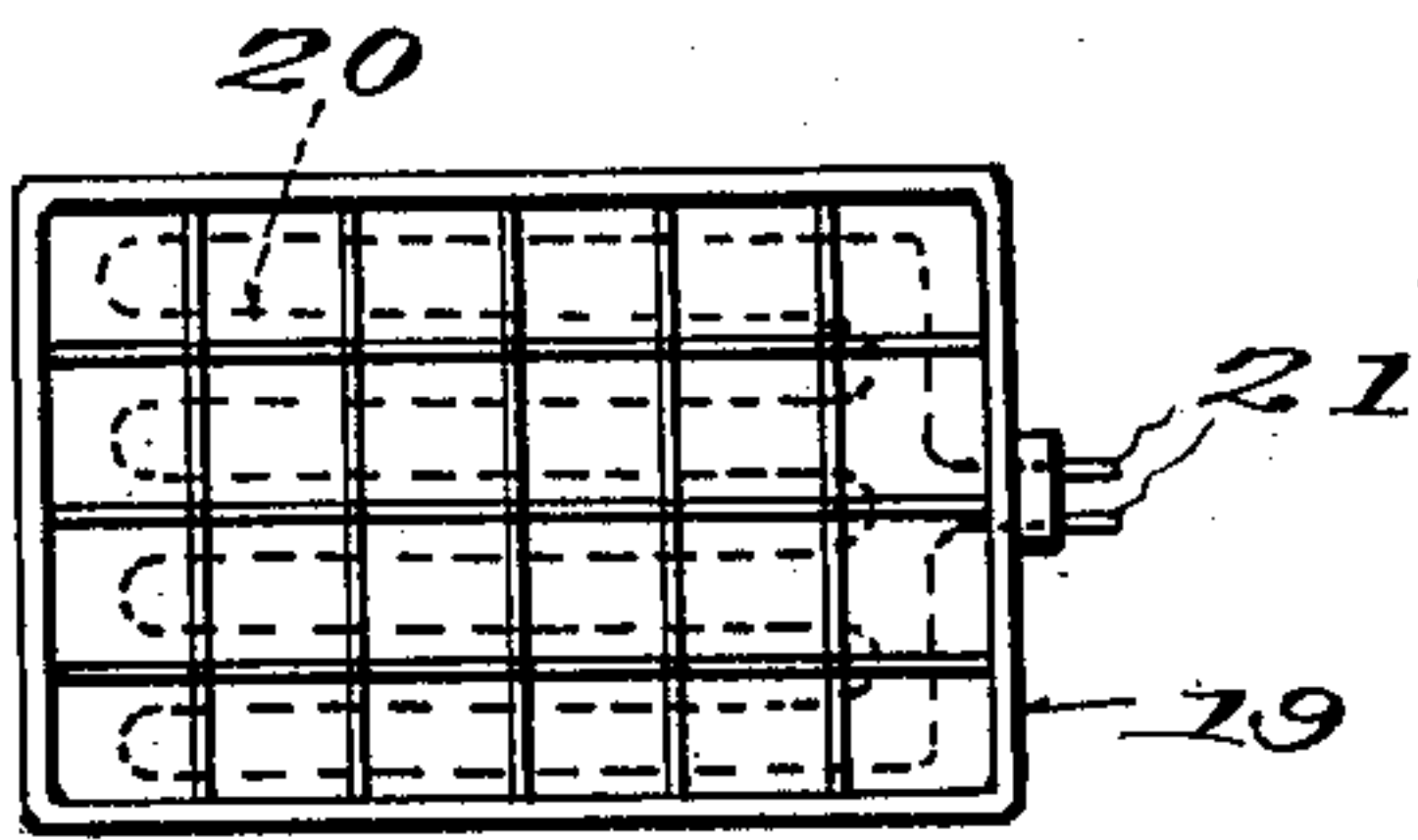


Fig. 2.

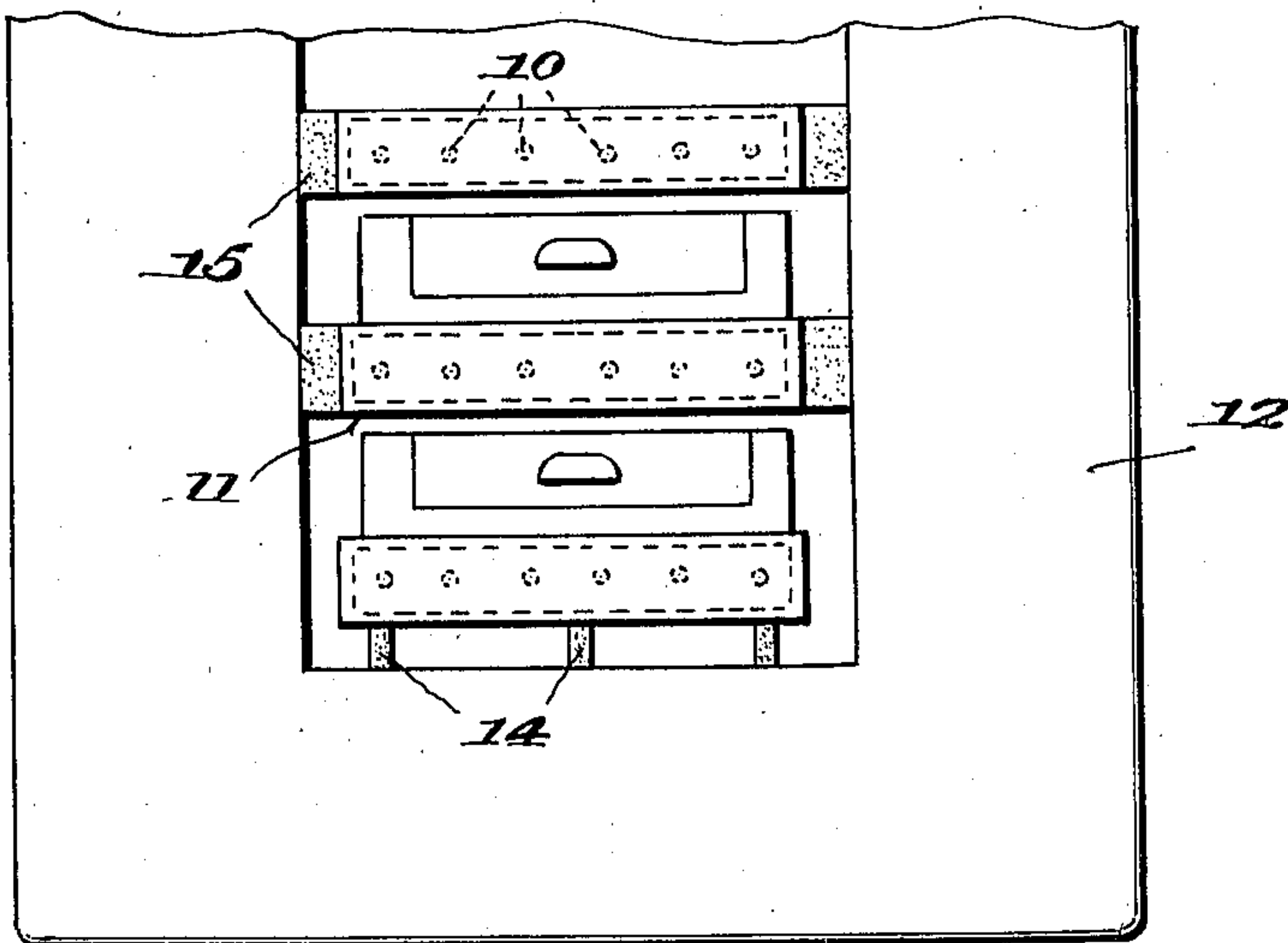
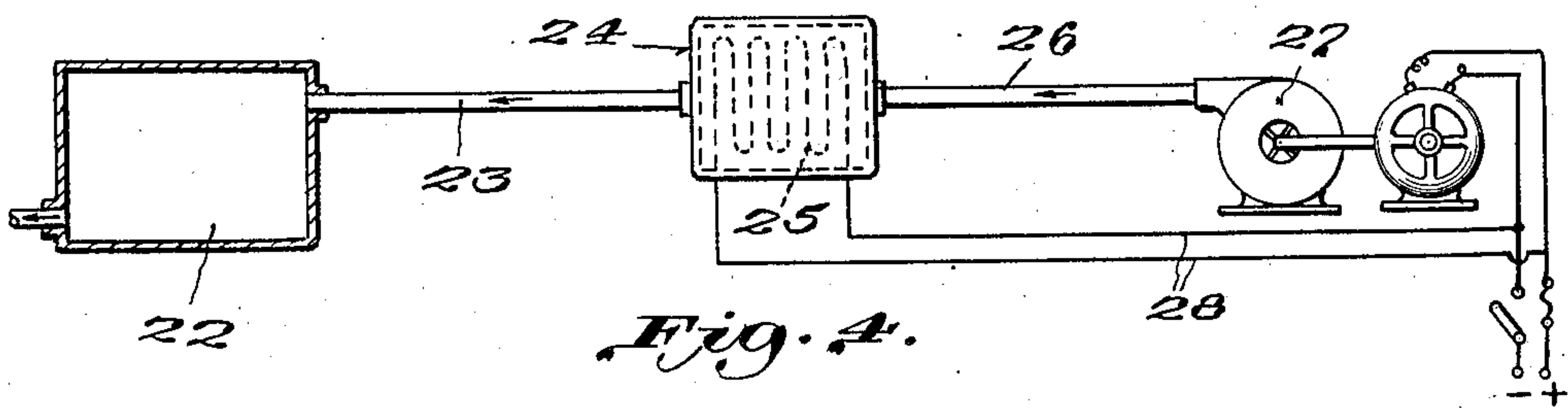


Fig. 4.



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UNITED STATES PATENT OFFICE

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REFRIGERATOR

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Application January 31, 1931, Serial No. 512,724

3 Claims. (Cl. 62—108.5)

A most useful feature of electric and other household refrigerators is the sliding tray arrangement for freezing small cubes of ice. As commonly constructed, these trays are a shallow pan with partitions at right angles to subdivide the interior of the can into the cube spaces of the desired size. However, this attractive feature of these refrigerators has its drawback in the freezing of the trays in their guides, and also the difficulty of release or emptying of the cubes from the trays. The trays freeze so tightly in their respective compartments that resort is had to knives, icepicks and other sharp instruments to loosen them, with the result that the trays themselves may be damaged, or the knives or other instruments, injured, or one's hands or fingers hurt, or cut, or perhaps of more serious consequence, the tubing for the refrigerant may be cut or broken and the refrigerant, in the form of a dangerous gas, thus escape. The wrenching or pulling of the tray handles, when no implements are used, may result in damage. And as the refrigerator doors must be kept open during these operations to release the trays, there is loss or damage from the rise of temperature within the open refrigerator. An object of my invention is to effect the release of the trays from their compartments in the refrigerator, and also of the cubes from the trays, by the application of heat locally at the time the freeing or liberation is to be done and thus obviate all of the consequences just mentioned when the prevailing or established construction of household refrigerator is employed. Another object is to apply heat locally for the purpose stated at the minimum of expense and with no other call upon the person applying the heat than the mere turning of a switch or a valve.

My objects may be achieved by apparatus or mechanism greatly varying in construction, and which in some forms uses electricity for the generation of the desired degree of heat, and in other forms supplies the heat otherwise than by the use of electricity.

My invention consists in whatever is described by or is included within the terms or scope of the appended claims.

In the drawing:—

Fig. 1 is a view largely diagrammatic, of an embodiment of my invention in which electrical appliances are employed to generate the desired heat in connection with the walls of the freezing unit which contains the removable ice cube trays or drawers;

Fig. 2 is a front elevation of said freezing unit with parts broken away;

Fig. 3 is a view partly in side elevation and partly in section of an embodiment of my invention in which the heat generating elements of the electrical means are applied to the ice cube tray;

Fig. 4 is a view, largely diagrammatic, showing a different embodiment of my invention in which heat is supplied to the freezing unit walls by warmed or heated air.

In the embodiment of my invention shown in Figs. 1 and 2, the heating means is electrical and the resistance wires, 10, are located or placed in a space or recess in the horizontal wall, 11, of the freezing unit, 12, which wall is immediately below the cube tray, 13, so that the bottom of the tray rests on the top of the wall. There will be such a wall 11, below each tray. In the case of the bottom wall, 11, it is separated at bottom and sides by an air space from the adjacent walls of the freezing unit and rests at its bottom upon separated heat insulators, 14, that are spaced apart. And in the case of the upper walls, 11, they are spaced apart at the sides from the inner sides of the freezing unit by heat-insulating spacer blocks, 15.

It will be seen that the heat generated by the heating elements, 10, will be most advantageously applied to the trays and with the minimum of heat reaching the surrounding walls of the freezing unit, 12.

As best shown in Fig. 1, the coils, 10, by wires 16, are connected to a source of supply of current—the house or apartment circuit, for example—and a switch, 17, is in the circuit and conveniently located on the front wall of the refrigerator so that with the greatest ease and convenience, the current may be turned on and off at will. Preferably the circuit includes a thermostat, 18, to prevent over-heating by opening the circuit at a predetermined temperature in the event that through oversight or neglect the switch might be left closed for too long a time.

In the form of my invention shown in Fig. 3, the bottom of the ice cube tray is made hollow or provided with a chamber, 19, in which is coiled the electrical resistance or heating unit, 20, the terminals of which are respectively joined to two plugs, 21, projecting from the exterior and adapted to contact with or enter sockets which are in electrical connection with the circuit. This detachable connection, of course, is necessary to enable the tray to be withdrawn for emptying, and replaced.

In the embodiment of my invention shown in

Fig. 4, the freezing unit has a chamber, or hollow wall, 22, as in the construction shown in Figs. 1 and 2, but no electrical heating elements are placed therein, but the heat is supplied by a small pipe or tube, 23, through which air heated by suitable means is passed to the chamber, 22. In refrigerators of the gas type, the heat may be supplied to the air from a gas burner. As shown in Fig. 4, an electric heater is provided which includes a box or chamber, 24, containing a resistance, or heating element, 25, to one side of which the pipe, 23, is connected and to the opposite side of which is connected a pipe 26, running from an electric-motor-driven blower 27. Electrical heating element, 25, and blower motor are in a circuit that includes wires, 28, connected with a source of current, the house or apartment circuit, and provided with a control switch, and if desired a thermostat, as in the circuit shown in Fig. 1, may be used.

What I claim is:—

1. A refrigerator having a tray-containing freezing unit with a space to receive a tray slidable into and out of such space, a heat-supplying member extending horizontally across such space

beneath a tray, and having a horizontal upper surface upon which the tray rests when within such space, means to supply heat to said member, comprising air-heating means external to the refrigerator, and a passage for heated air communicating with the interior of said member.

2. A refrigerator having a tray-containing freezing unit with a tray-receiving space and means in such space to support a tray, a heated air-receiving space contiguous to the tray, a motor-driven air blower external to the refrigerator, a heated air passage between such blower and such heated air space, and air heating means in such passage.

3. A refrigerator having a tray-containing freezing unit with a tray-receiving space and means in such space to support a tray, a heated air-receiving space contiguous to the tray, a motor-driven air blower external to the refrigerator, a heated air passage between such blower and such heated air space, and air heating means in such passage, comprising an electric heater, said blower motor being electrical, and motor and electric heater being in the same circuit.

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