No. 635,882. Patented Oct. 31, 1899.

H. TORRANCE, JR.

REFRIGERATING SYSTEM.

(Application filed Nov. 2, 1898.)

(No Model.)

Fig. 1

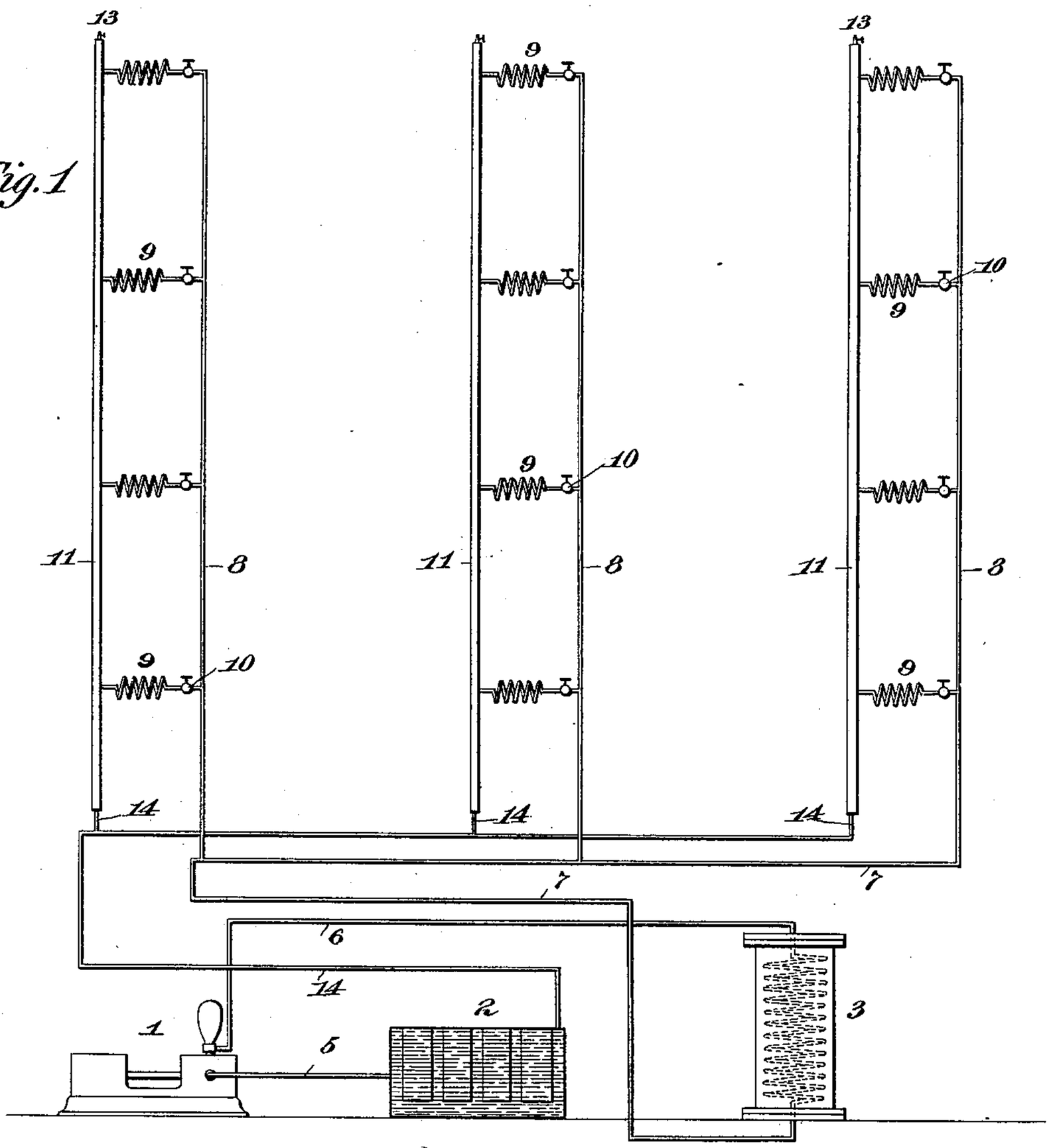


Fig. 2

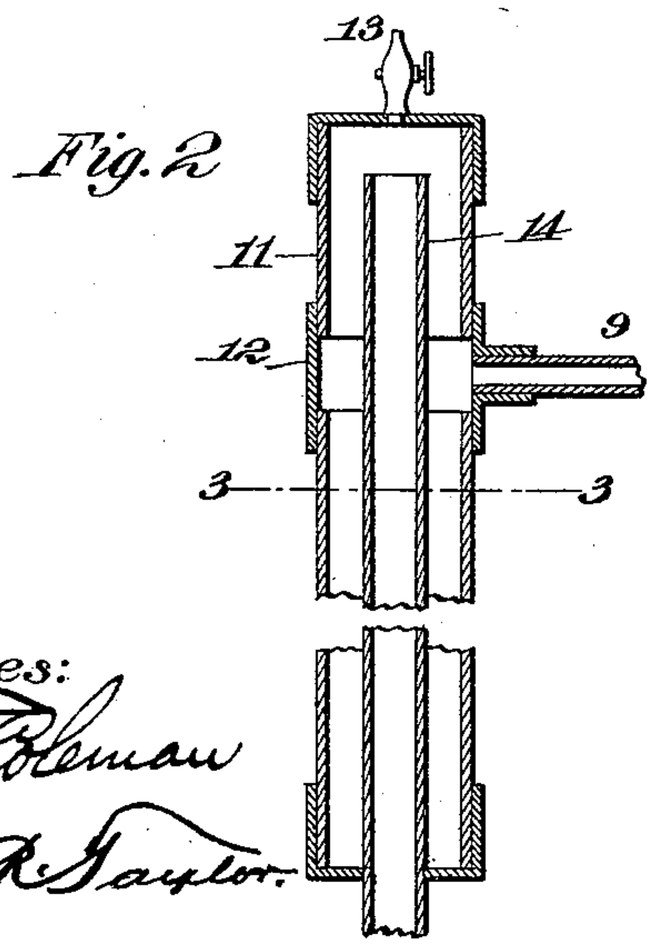
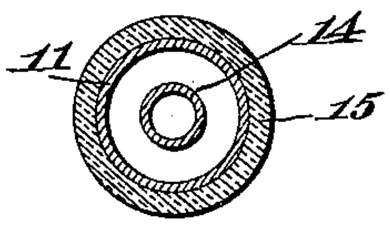


Fig. 3



Witnesses:
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UNITED STATES PATENT OFFICE.

HENRY TORRANCE, JR., OF TENAFLY, NEW JERSEY.

REFRIGERATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 635,882, dated October 31, 1899.

Application filed November 2, 1898. Serial No. 695,252. (No model.)

To all whom it may concern:

Be it known that I, HENRY TORRANCE, Jr., a citizen of the United States, and a resident of Tenafly, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Refrigerating Systems, of which the following is a specification.

In some large modern apartment-houses the several flats or suites are provided with cold-storage receptacles for the preservation of perishable material, &c., which are cooled by the circulation of cold brine from a brine-cooler in the basement. When these systems were first suggested, it was attempted to distribute the cold brine throughout the several cold-storage receptacles by providing one or more conveying pipes or risers extending vertically through the walls of the building by connecting to each of these vertical pipes a series of smaller brine-circulating pipes which were mounted within the cold-storage receptacles, and by returning the cooled brine from the latter pipes through a return pipe or pipes extending substantially parallel with the risers and also mounted in the walls of the building. Both the risers and return-pipes were connected to a suitable pump, by which the material could be circulated up through the risers, across through the cooling-coils, and down through the return-pipes. A brine-tank was generally employed, acting as a reservoir and in which was sometimes located a series of ice-molds for the manufacture of ice, and a brine-cooler was also employed for the cooling of the brine by any desired method. It was found, however, that such an apparatus was not commercially operative for the reason that the brine-coils on the lower floors of the building received more than their proportion of the circulation, while the brine in the coils in the upper floors of the building was almost absolutely inert. Efforts were made to remedy this by suitable regulating-valves throughout the building and by which the supply of brine to the lowermost coils was less than that to the upper coils; but this was unsuccessful. In order to overcome these objections, it was proposed to employ a balanced system of distribution, the exit pipe or pipes leading upward toward the roof instead of downward and being connected at their upper ends by a descending return-pipe extending parallel to the risers and exit-pipes. In this way the brine throughout the entire system was caused to circulate an equal distance.

My present invention relates to improvements in balanced refrigerating systems, and the particular object is to provide a balanced system wherein considerable economy will be effected in the construction and operation and particularly in the cost of insulating material for the pipes.

In carrying out my invention I employ one or more risers extending vertically, a plurality of circulating-coils connected with the risers and mounted in the cold-storage receptacles, an exit-pipe to which all of the cooling-coils are connected, and a return-pipe located within the exit-pipe. In this way I require to insulate only the risers and the exit-pipe instead of, as is now the case, the risers, the exit-pipes, and the return-pipes. While the exit pipe or pipes of my system are larger than the exit-pipes of ordinary balanced systems, since they contain the return-pipes themselves, the cost of insulating such exit-pipes is but very slightly greater than the cost of insulating a much smaller exit-pipe.

In order that my invention may be better understood, attention is directed to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a diagrammatic view illustrating the entire system, showing three risers; Fig. 2, an enlarged vertical section of the exit-pipe and return-pipe, and Fig. 3 a section on the line 3 3 of Fig. 2.

In all of the above views corresponding parts are represented by the same numerals of reference.

1 represents a brine-circulating pump of any suitable type, 2 a brine-tank, and 3 a brine-cooler. The brine-tank and brine-cooler are of any suitable character, and, if desired, the brine-tank may be dispensed with. A plurality of ice-molds 4 may be located in the brine-tank for the purpose of making ice for the building. A pipe 5 leads from the brine-tank 2 to the suction end of the pump 1, and a pipe 6 leads from the pressure end of said pump to the brine-cooler 3. By means of this brine-cooler the brine drawn

from the tank 2 by the pump 1 may be properly cooled. From the brine-cooler 3 the cooled brine passes by a pipe 7 to the upright pipes or risers 8, three being shown and located, preferably, in the walls of the building. Connected with each of the risers 8 are a plurality of cooling-coils 9, each being of small bore and located in the cold-storage receptacle of the several apartments, as is now common. Each cooling-coil may be provided with a valve 10 therein by which the circulation through the same may be stopped when desired. Each set of cooling-coils 9 connects with an exit-pipe 11, extending parallel with each of the risers and located also preferably in the walls of the building. The connection between the coils 9 and the exit-pipe 11 may be of any suitable character, as, for instance by means of ordinary T's 12, as shown in Fig. 2. The exit-pipe 11 is closed both at its top and bottom, as shown, and at the top may be provided with an air-valve 13, by which air may be removed from the system when it is started. Located within the exit-pipe 11 is a return-pipe 14, open at its upper end and extending through the closed lower end of the exit-pipe. This return-pipe 14 leads back to the tank 2. Both the risers 8 and the exit-pipe 11 are suitably covered with a layer of suitable insulating material 15, as shown in Fig. 3. It will be, of course, understood that several sets of the cooling-coils 9 may be connected with a single riser, each set being connected with an exit-pipe, that each set may be connected to a riser and several sets connected to a common exit-pipe, or that several sets may be connected to a common riser and a common exit-pipe.

The operation will be as follows: Brine from the tank 2 will be drawn by suction by the pump 1 through the pipe 5 and forced by pressure through the pipe 6 to the cooler 3, in which the brine will be cooled to the proper temperature. From the brine-cooler 3 the cold brine will be circulated through the pipe 7 into the risers 8. From the risers 8 the brine will pass through the cooling-coils 9, so as to lower the temperature in the cold-storage receptacles. From the cooling-coils 9 the brine passes into the exit-pipe 11 and ascends therein almost to the top of said exit-pipe, escaping into the upper end of the return-pipe 14, by which it is conveyed back to the brine-tank 2, as shown. In this way a perfectly-balanced system is obtained, since the brine in passing through each of the cooling-coils 9 partakes of the same extent of travel. By locating the return-pipe 14 within the exit-pipe 11 I obtain a material saving in the cost of insulation, as I thereby dispense with a separate insulation for each of the return-pipes 14.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. In a balanced refrigerating system, the combination of a circulating-pump, a riser connected to said pump, a series of cooling-coils connected to said riser, an exit-pipe connected with said cooling-coils, and a return-pipe located within said exit-pipe, substantially as set forth.

2. In a balanced refrigerating system, the combination of a circulating-pump, a riser connected to said pump, a series of cooling-coils connected to said riser, an exit-pipe connected with said cooling-coils, a return-pipe located within said exit-pipe, and a valve in each cooling-coil, substantially as set forth.

3. In a balanced refrigerating system, the combination of a circulating-pump, a riser connected to said pump, a series of cooling-coils connected to said riser, an exit-pipe connected with said cooling-coils, a return-pipe located within said exit-pipe, and an insulating-covering for the riser and exit-pipe, substantially as set forth.

4. In a balanced refrigerating system, the combination of a brine-tank for containing the brine-supply, a brine-pump connected to said brine-tank, a brine-cooler connected to said pump, a riser connected to said brine-cooler, a series of cooling-coils connected to said riser, an exit-pipe connected to said cooling-coils, and a return-pipe mounted within said exit-pipe and connected to said brine-tank, substantially as set forth.

5. In a balanced refrigerating system, the combination of a brine-pump, a series of risers connected to said pump, each riser receiving a portion of the supply of the pump, a series of cooling-coils connected with each riser, an exit-pipe connected with each series of cooling-coils, and a return-pipe located in each exit-pipe, substantially as set forth.

6. In a balanced refrigerating system, the combination of a brine-pump, a series of risers connected to said pump, each riser receiving a portion of the supply of the pump, a series of cooling-coils connected with each riser, an exit-pipe connected with each series of cooling-coils, a return-pipe located in each exit-pipe, and a brine-tank with which the said pump is connected and to which the discharge from each of said return-pipes is conveyed, substantially as set forth.

This specification signed and witnessed this 18th day of October, 1898.

HENRY TORRANCE, JR.

Witnesses:
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