(No Model.) 4 Sheets—Sheet 1.

J. RING.

AMMONIA SYSTEM FOR COOLING ROOMS, &c.

No. 388,722. Patented Aug. 28, 1888.

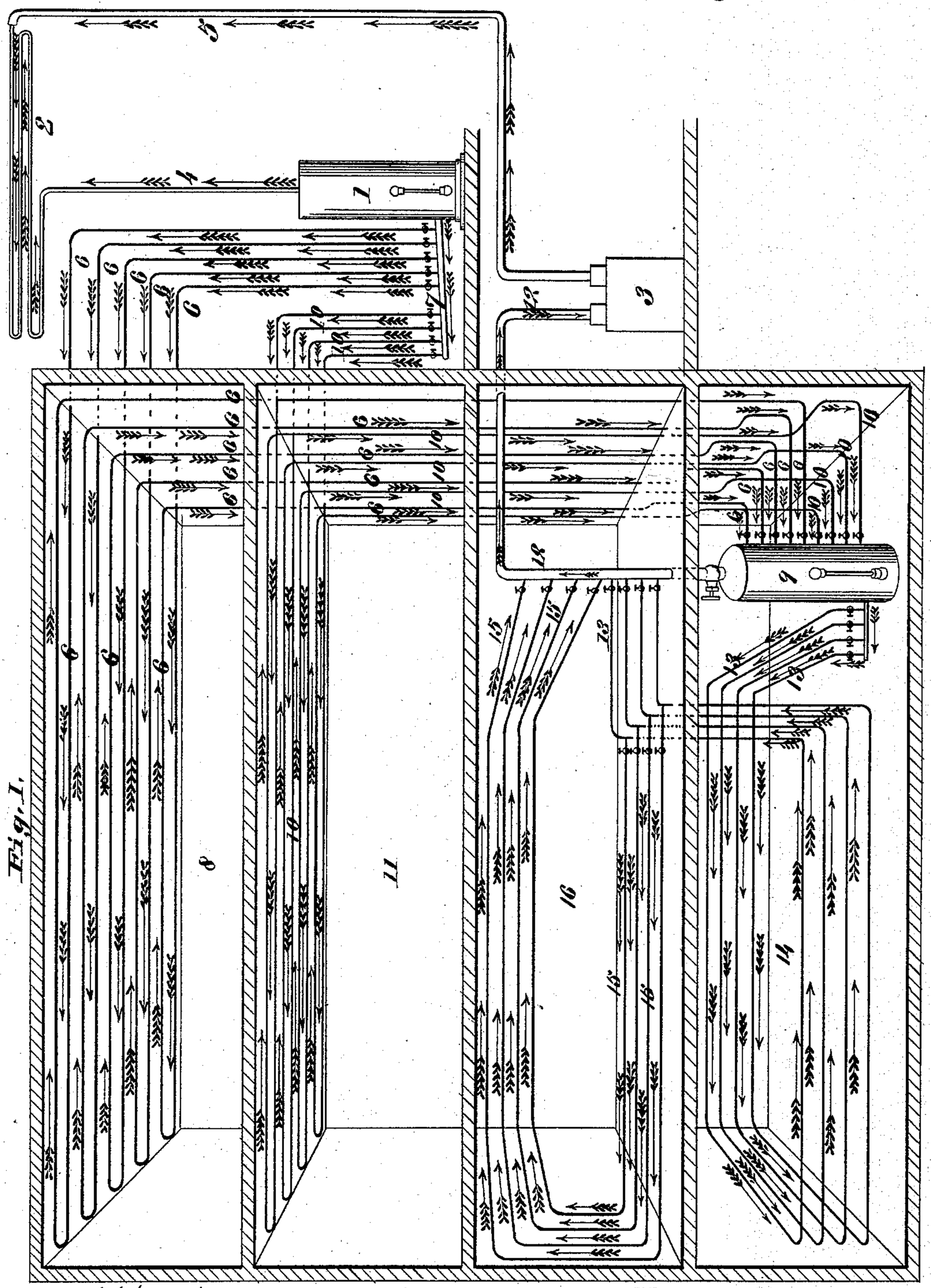

Fig. 1.

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Fig. II

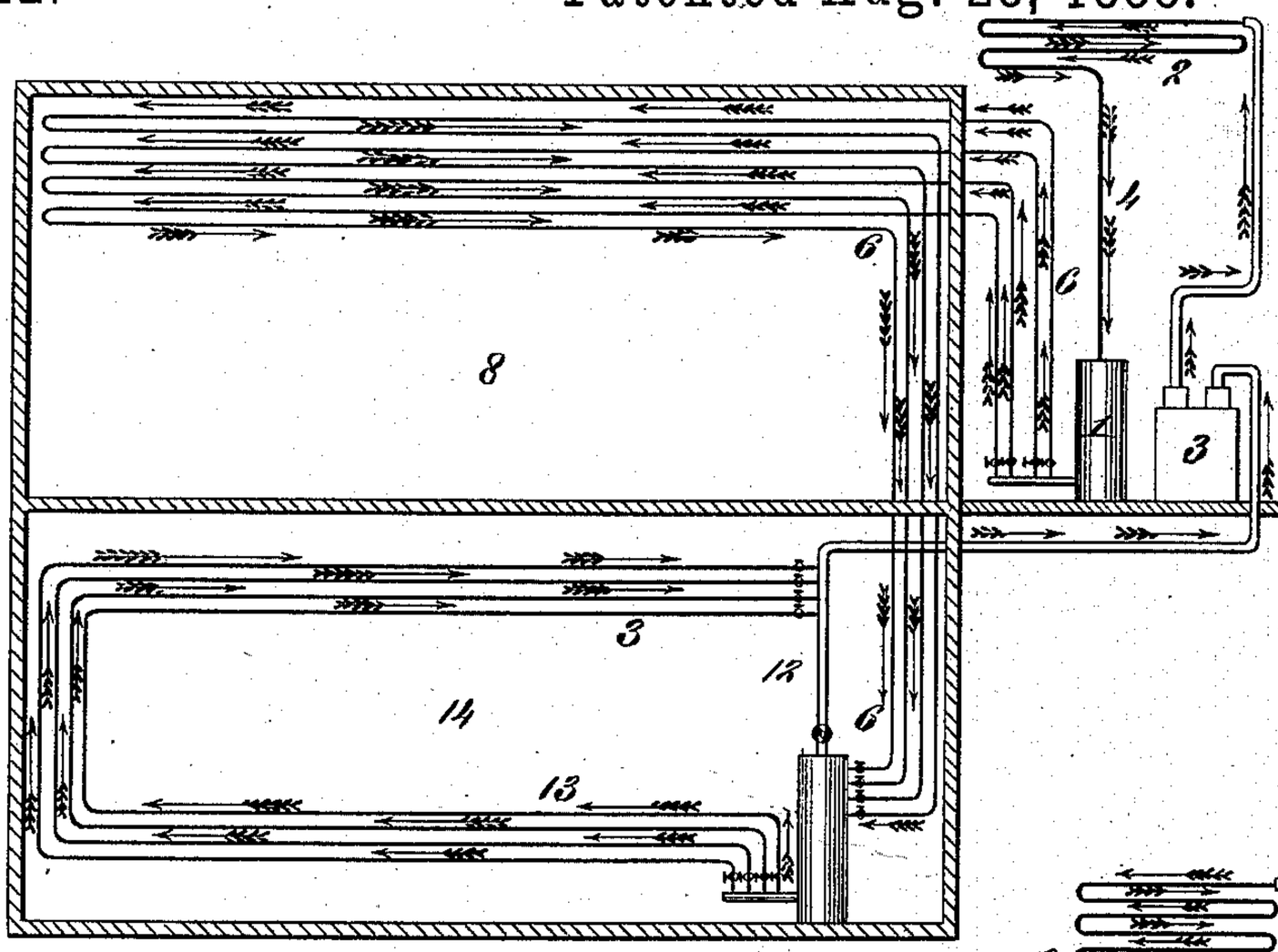

Fig. III

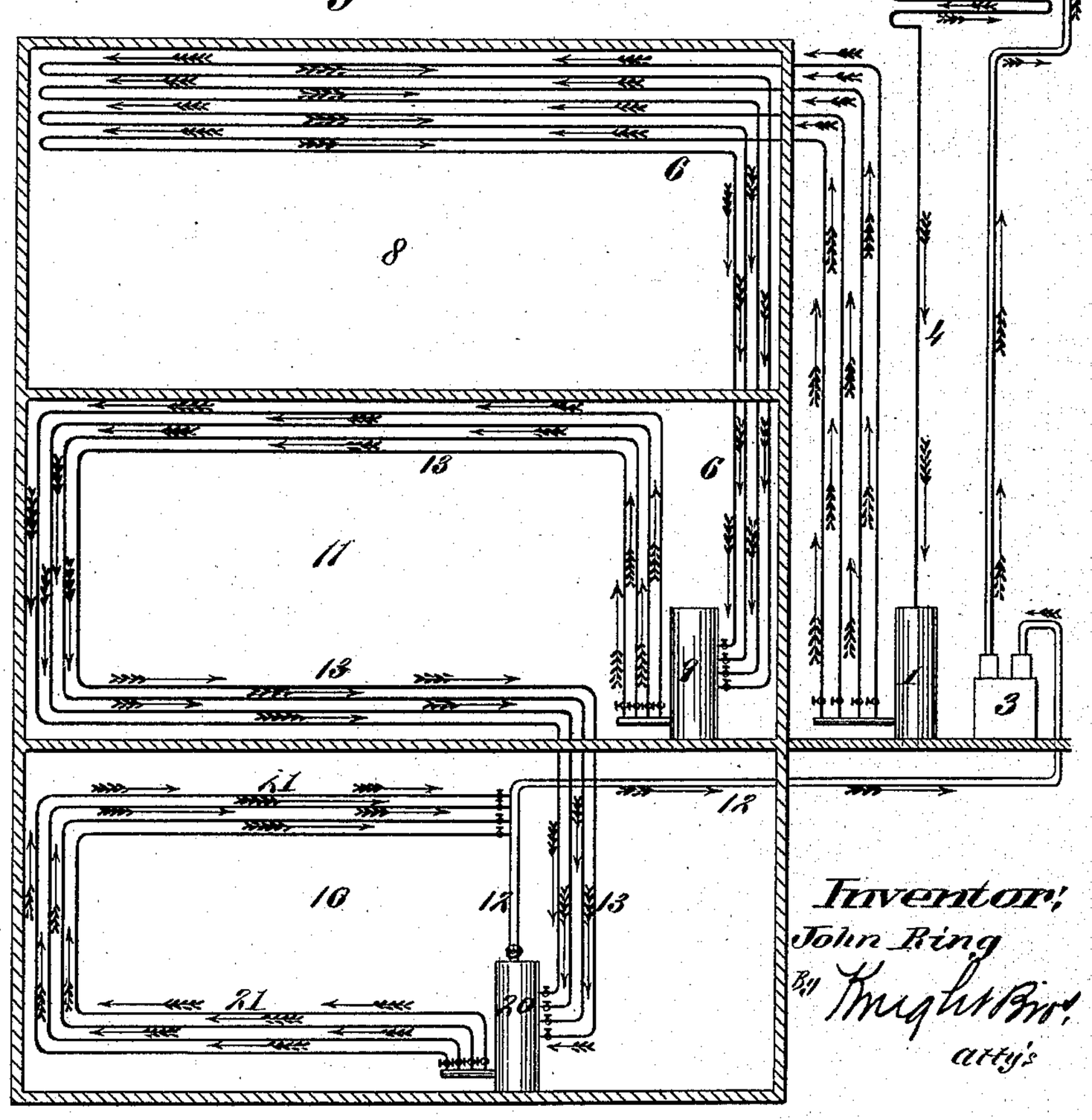

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Fig. IV.

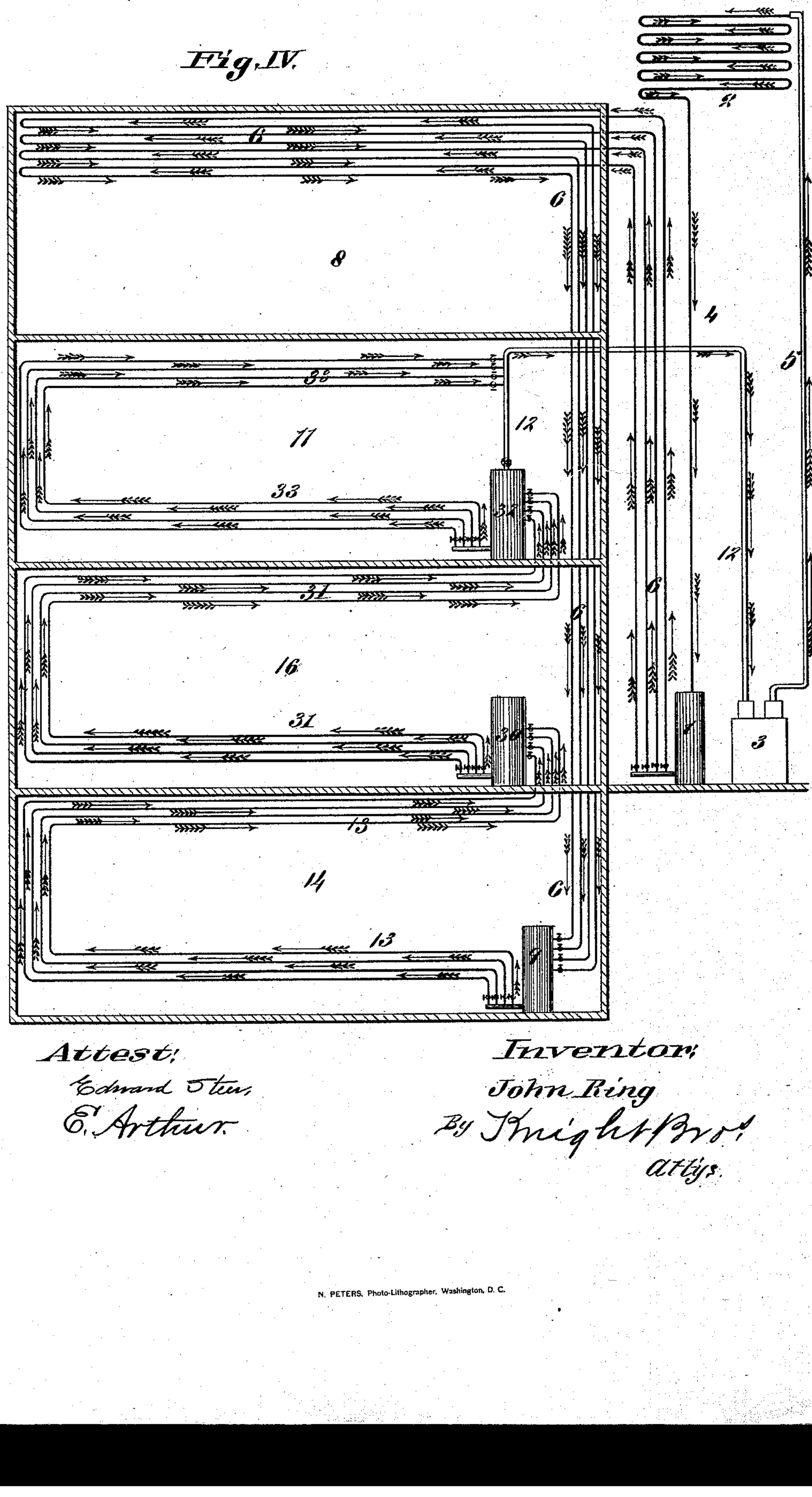

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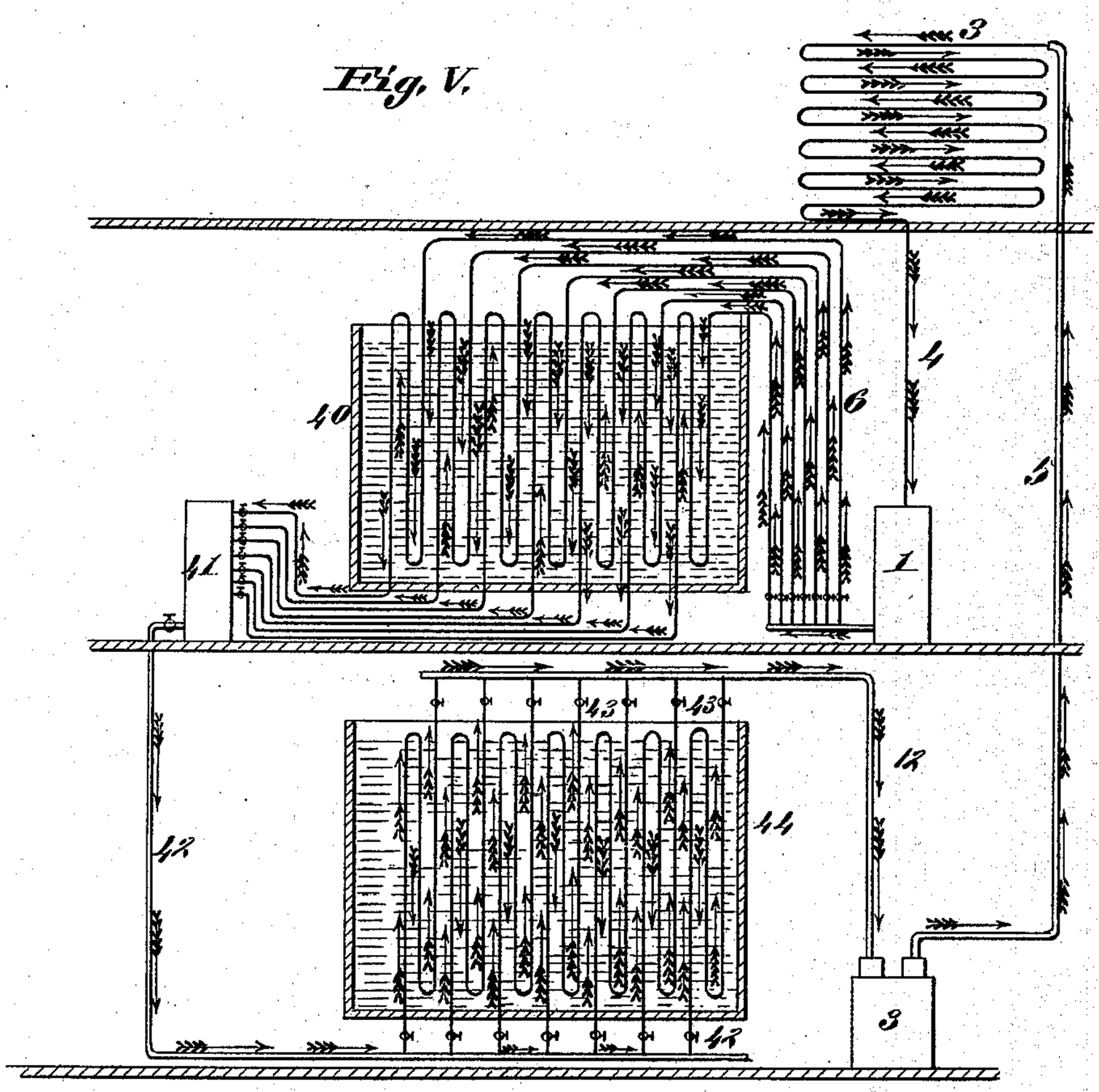
Fig. V.



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UNITED STATES PATENT OFFICE.

JOHN RING, OF ST. LOUIS, MISSOURI.

AMMONIA SYSTEM FOR COOLING ROOMS, &c.

SPECIFICATION forming part of Letters Patent No. 388,722, dated August 28, 1888.

Application filed April 29, 1887. Serial No. 236,576. (No model.)

To all whom it may concern:

Be it known that I, JOHN RING, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Ammonia Systems for Cooling Rooms, &c., of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, and in which—

Figure I is a vertical section through a building provided with my improved system, the system being shown in perspective. Fig. II is a similar view showing the system in a slightly-modified form. Fig. III is a similar view showing the system in still another slightly-modified form, and Fig. IV is a similar view showing another modified form. Fig. V is a similar view showing the system applied to cooling brine for use in refrigerating systems instead of cooling rooms, as shown in the other figures.

My invention relates to an improvement in a cooling or refrigerating system wherein ammonia-gas is employed; and the leading distinctive feature of my invention consists in providing the cooling-pipes with one or more accumulators, the outlet or outlets from which pass through one or more rooms or their equivalent to cool them, and which are smaller in area than the inlets into the accumulators, so that the ammonia entering the accumulators in a gaseous form is liquefied by the pressure caused by the inlet area being greater than the outlet. The liquid thus produced is circulated through the said outlet-pipes, which extend through one or more rooms or their equivalent, as stated, before communicating with a common pipe through which the gas is carried back to the pump.

It has been common heretofore to provide an accumulator into which the cooling-pipes discharge and from which a single pipe passes the gas back to the pump. My invention is distinctive from this, in that, instead of carrying the gas back to the pump, a certain amount of it is liquefied in the accumulator by the area of the inlet-pipes exceeding that of the outlet-pipes, as stated, and the ammonia thus liquefied is then caused to be re-expanded through cooling-pipes located in one or more rooms before it is conveyed to the pump. The result of this, by actual experiment, has been found to be a great saving in the power required to operate the pump in proportion to the area or number of rooms cooled by the action of the pump.

Referring to the drawings, Fig. I, 1 represents a receiver of an ammonia refrigerating system; 2, a condenser, and 3 a pump, the receiver communicating with the condenser through a pipe, 4, and the condenser communicating with the pump through a pipe, 5.

6 represents one or more pipes passing from a common pipe, 7, that connects them to the receiver. These pipes are passed in coils through a room, 8, and thence downward to an accumulator, 9. 10 represents another set of pipes communicating with the pipe 7, and which passes through another room and then to the accumulator, as shown. The gas thus passes by expansion from the receiver through these pipes 6 and 10 into the accumulator. It has been customary heretofore to take this gas back to the pump for the purpose of reliquefying it, (through a pipe, 12;) but I have found by experiment that by connecting pipes to the accumulator the area in cross-section of which is less than that of the inlet-pipes, so that the gas is not allowed to escape as fast as it enters, it will become liquefied, and the liquid thus produced may be passed through one or more pipes, 13, in a room, 14, to cool this room, and may then pass through the pipe 12 and be carried back to the pump; or, instead of passing directly into the pipe 12 from the room 14, the gas may pass through other pipes, 15, connected to those 13 and arranged in a room, 16. The pipes 15 will be connected to the pipe 12, so that the gas will be carried back to the pump, and thence forced to the condenser to be reliquefied.

With this construction I am enabled, as before stated, to produce a greater amount of cooling-surface with a pump of certain size than has heretofore been possible where the gas is taken directly from the accumulator to the pump, or where no condensation or liquefaction in the accumulator takes place.

My invention is susceptible of being changed into various forms, of which I will describe a few.

In Fig. II but two rooms are cooled—one, 8,

by the pipes 6, and one, 14, by the pipes 13. In this case the pipes 6 should be either greater in number than the pipes 13 or be larger in interior diameter, so that they have a greater area than the pipes 13.

In Fig. III, I have shown three rooms and two accumulators, the pipes 6 cooling one room, 8, and then passing to another room, 11, wherein the accumulator 9 is located, and from here the pipes 13 pass through the room 11 into the room 16, where they communicate with another accumulator, 20, and with a set of pipes, 21, forming a communication between the accumulator 20 and pipe 12. In this case, also, the inlet pipe or pipes should be greater in number or in area than the outlet pipe or pipes.

In Fig. IV, I have shown four rooms, as in Fig. I, and the three lower rooms are provided each with an accumulator, the pipes 6 passing from the room 8 down to the room 14 and communicating with the accumulator 9, and the pipes 13 passing from the accumulator 9 to the room 16, and there communicating with an accumulator, 30, with which pipes 31 also communicate, the pipes 31 extending into the room 11, from there communicating with an accumulator, 32, with which also communicate pipes 33, communicating with the pipe 12, that leads back to the pump.

In Fig. V, I have shown the pipes 6 located in a brine-tank, 40, for the purpose of cooling the brine, and which passes from the tank to an accumulator, 41, with which communicates a pipe, 42, with which is connected a number of pipes, 43, passing through a brine tank, 44, and communicating with the pipe 12, that conveys the gas back to the pump. The brine in the tank 44 is thus cooled by the expansion of ammonia that is liquefied in the accumulator 41.

While I have described several modifications of my system, I do not confine myself even to these, as it is evident that there are still others that could be arranged without departing from the spirit of the invention.

I claim as my invention—

1. In combination with a pump, an accumulator and a receiver, pipes forming a communication between said receiver and the accumulator, and a pipe forming a communication between the accumulator and receiver, the area in cross-section of the inlet-pipe of the accumulator being greater than the area of the outlet-pipe, and said pipes being arranged, respectively, to cool one or more rooms, substantially as set forth.

2. In an ammonia cooling system, the combination of the receiver 1, condenser 2, pump 3, pipe 5, pipe 6, communicating with the receiver and located within a room, accumulator with which the pipes 6 communicate, pipes 13, located within a room and communicating with the accumulator, pipes 15, communicating with the pipes 13 and located within a room, 16, and a pipe, 12, with which the pipes 15 communicate, substantially as and for the purpose set forth.

JOHN RING.

In presence of—
GEO. H. KNIGHT,
JOSEPH WAHLE.