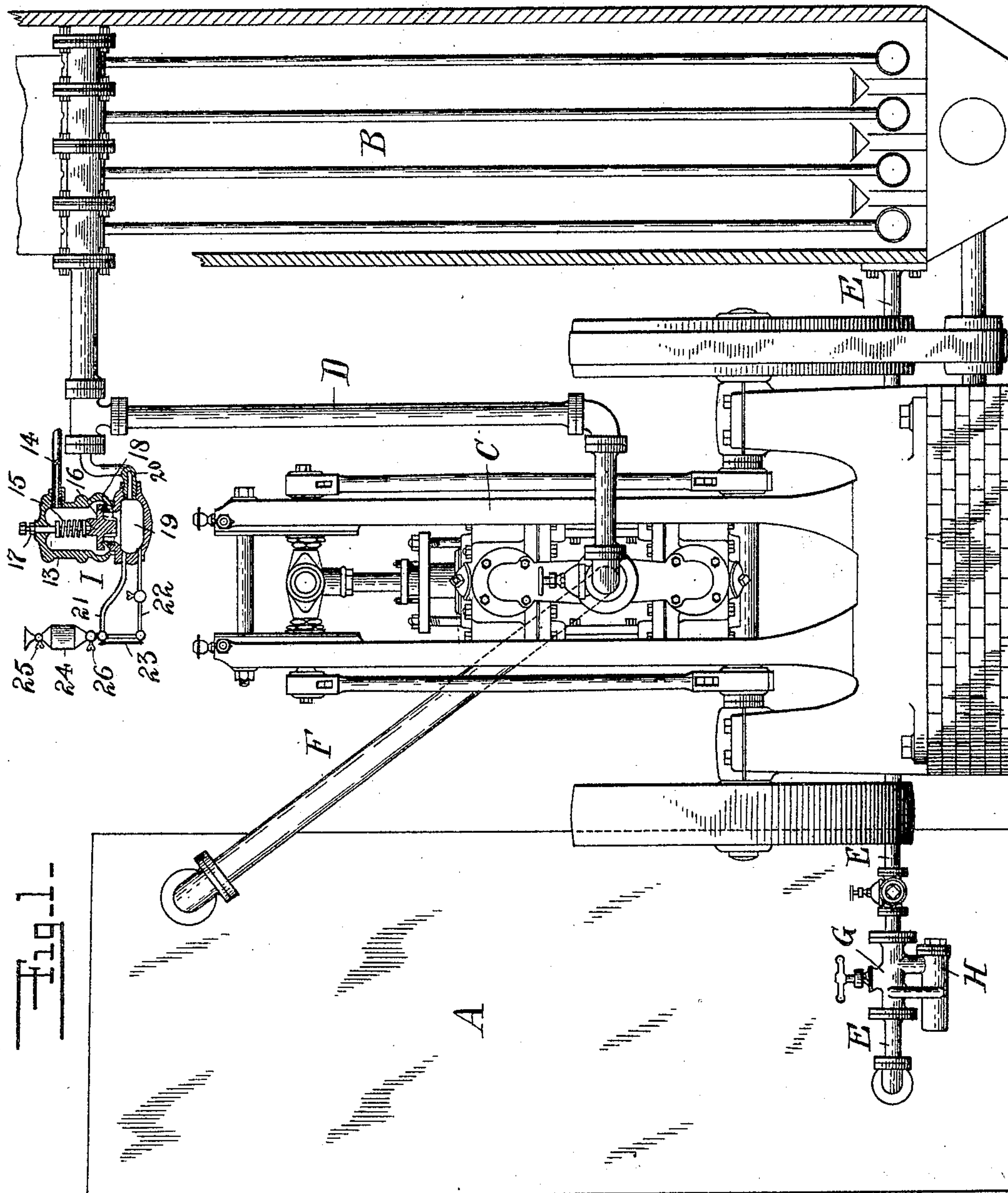


C. C. PALMER.
REFRIGERATING APPARATUS.
APPLICATION FILED JUNE 26, 1902.

2 SHEETS—SHEET 1.



Witnesses:

J. B. McGirr.
Walter A. Pauling

Inventor

Cassius C. Palmer
by Gifford & Bull
Atty

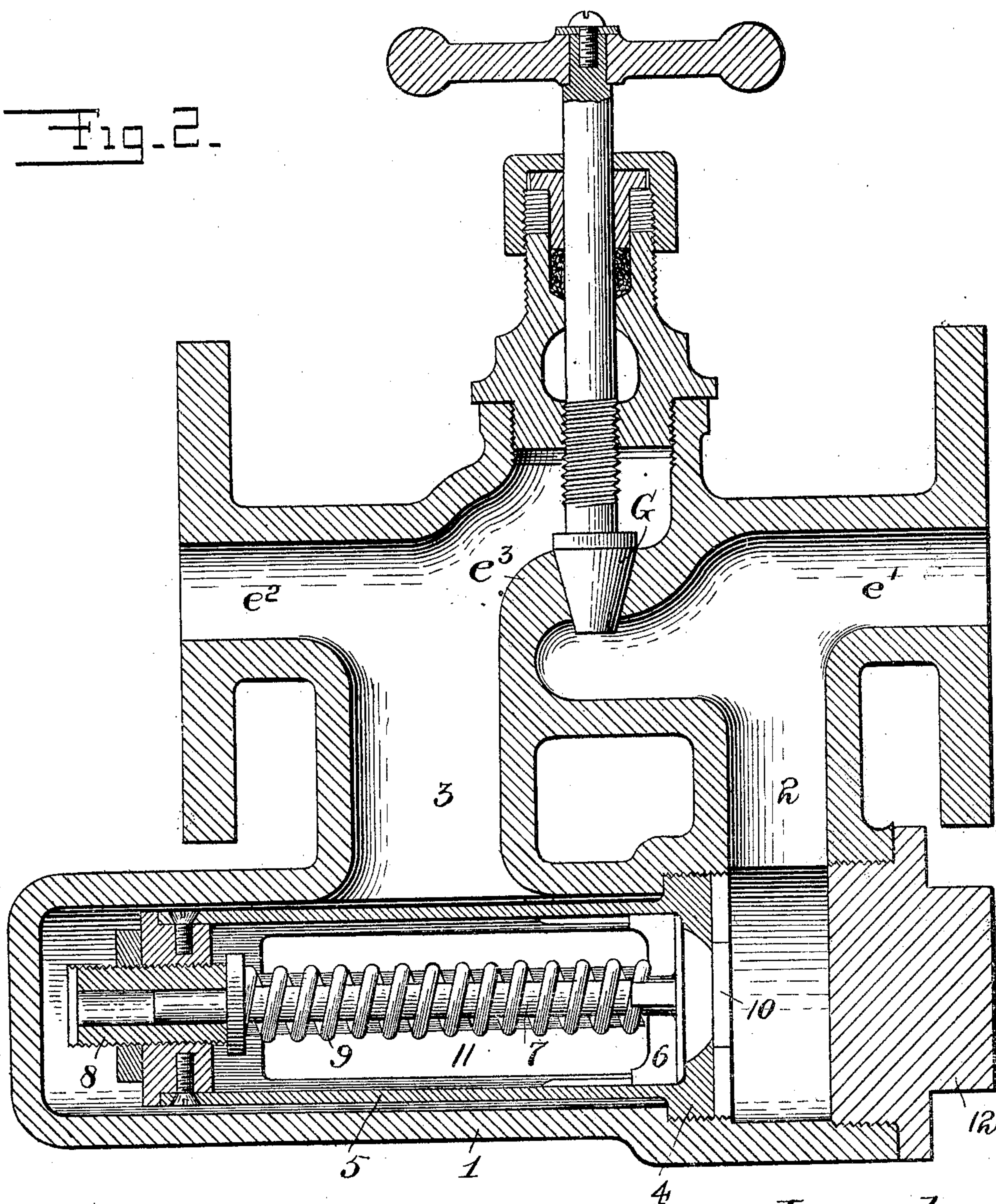
No. 803,189.

PATENTED OCT. 31, 1905.

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2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

CASSIUS C. PALMER, OF NEW YORK, N. Y., ASSIGNOR TO RAILWAY & STATIONARY REFRIGERATING COMPANY, A CORPORATION OF DELAWARE.

REFRIGERATING APPARATUS.

No. 803,189.

Specification of Letters Patent.

Patented Oct. 31, 1905.

Application filed June 26, 1902. Serial No. 113,193.

To all whom it may concern:

Be it known that I, CASSIUS C. PALMER, a citizen of the United States, and a resident of New York city, borough of Manhattan, county
5 of New York, and State of New York, have invented a new and useful Improvement in Refrigerating Apparatus, of which the following is a specification.

The object of my improvement is to increase
10 the safety of refrigerating apparatus employing a compressed and expanded fluid.

In the accompanying drawings, Figure 1 is a diagrammatic elevation of an apparatus with certain elements thereof in section. Fig. 2 is
15 a vertical section of a feed-valve and adjacent parts.

In Fig. 1, A is the refrigerator; B, the condenser; C, the compressor; D, the pipe leading from the compressor to the condenser; E, the
20 pipe leading from the condenser to the refrigerator; F, the pipe leading from the refrigerator to the compressor, and G the feed-valve, all of said parts being constructed substantially as heretofore, and therefore requiring no detailed description. H is a by-pass
25 around the feed-valve G. I is a blow-off valve which is the subject of my Patent No. 689,512, dated December 24, 1901, the combination of which with the parts above referred to constitutes my invention.
30

Referring now to Fig. 2, G is the ordinary conical feed-valve controlling the flow of the fluid from the condenser to the refrigerator, so as to maintain the proper pressures for
35 compression in the condenser and expansion in the refrigerator of the refrigerating fluid which is employed, such as chlorid of ethyl or ammonia. That portion of passage E leading from the condenser to the feed-valve is lettered
40 e' , and that portion thereof leading from the feed-valve to the refrigerator is lettered e'' , and the partition between these passages, in which the feed-valve is seated, is lettered e''' . The cylinder 1 and the passages 2 and 3
45 constitute a by-pass passage from the passage e' to the passage e'' around the feed-valve G. In the cylinder 1 is placed a valve-seat 4, carrying a valve-cage 5 for the valve 6, opening toward the passage 3. The valve 6 is provided with a valve-stem 7, having a suitable
50 bearing 8 at the opposite end of the cage, and between this bearing and the valve is interposed the coiled spring 9, tending to hold the valve against its seat 4. When the valve 6 is
55 opened, the fluid passes from the passage 2,

through the port 10, into the valve-cage, and thence out through lateral openings 11 into the space between the valve-cage and the cylinder 1, and thence into the passage 3. The
60 cylinder 1 is provided with a removable head 12, by the removal of which the valve, its spring, stem, cage, and seat can all be removed from or inserted into the cylinder endwise. If desired, the valve-seat 4 or valve-disk, or
65 both, may be made of fusible material, so that an excess of temperature will fuse the same and open the by-pass passage.

The tension-spring 9 can be regulated by the adjustment of its rear bearing 8 in the cage, said rear bearing being screw-threaded
70 in the cage for that purpose. This adjustment is so regulated that the tension-spring will prevent the opening of the valve 6 under normal conditions of operation of the refrigerating apparatus. The tension, however, of
75 the spring 9 is so regulated that if the pressure in the condenser and passage e' become excessive such excessive pressure will force the valve 6 open in opposition to the spring 9 and permit the fluid to flow through the by-
80 pass passage from the passage e' to the passage e'' around the feed-valve G. Such excessive pressure in the condenser and passage e' may result from various causes, but principally from the clogging of the feed-valve G.
85 By this by-pass passage with its valve under regulatable tension undue pressure will relieve it without injury to the apparatus and without loss of refrigerating fluid and without seriously impairing the continuity or the
90 uniformity of the refrigerating operation. However, to guard against danger from such an excess of pressure as the valved by-pass passage already referred to might be unable
95 to take care of I employ in combination therewith the blow-off valve I, described in my Patent No. 689,512, and so regulate the tension of the spring controlling said blow-off valve
100 in excess of the tension of the spring 9, controlling the valve 6 of said by-pass passage that the pressure will open said valve 6 in advance of said blow-off valve, and thus give
105 the valve 6 a chance to relieve the pressure before incurring the loss of refrigerating fluid and interruption of refrigerating process
110 In practice the tension exerted by the spring 9 upon the by-pass valve 6 may be forty pounds and that exerted by the spring upon the blow-off valve may be sixty pounds.

The blow-off valve may be described as follows: 13 is a case which surrounds the upper end of the valve and receives the escaping gas or fluid, as the case may be. To this case is
5 connected a pipe 14, through which the fluid escapes to any convenient point. This case surrounds the spring 15 and the valve proper, 16. The spring 15 is controlled in its pressure by an adjustable bolt 17, which screws
10 through the upper head of the case 13. The valve 16 seats upon a ring 18, which is either composed of some material which has a low fusing-point or is composed of a material having openings filled with plugs of low fusible
15 metal. The construction indicated is that in which the entire ring is composed of low fusible material. The chamber 19 beneath the valve is connected, by means of the pipe 20, with the pipe D. The chamber 19 and a portion of the pipe 20 are preferably filled with
20 glycerin or other liquid which will act to form a more perfect seal for the valve. For the purpose of filling the chamber 19 with glycerin I provide the pipes 21 and 22, connected, respectively, with the top and bottom
25 thereof and having their ends connected with a glass gage 23, by means of which the level of the fluid may be observed. 24 is a filling-

chamber provided with valves 25 and 26 at the top and bottom thereof. 30

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

In a refrigerating apparatus, in combination, the compressor, the condenser, the refrigerator, connecting-pipes making a closed
35 circuit through which the same refrigerating fluid passes over and over again, a feed-valve in the pipe between the condenser and refrigerator, a by-pass passage around said feed-
40 valve, a valve in said by-pass passage, a blow-off valve in the pipe between the compressor and condenser and springs whereby said valves are yieldingly held closed; the blow-off valve
45 spring being stronger than the by-pass valve spring whereby the normal pressure from the compressor will be primarily relieved through said by-pass passage.

In testimony whereof I have hereunto signed my name in the presence of two subscribing
50 witnesses.

CASSIUS C. PALMER.

Witnesses:

ADOLPH FUCHS,
CHARLES RATHJEN.