

No. 655,120.

Patented July 31, 1900.

H. RENNO.

COMPRESSOR FOR REFRIGERATING MACHINES.

(Application filed Feb. 2, 1900.)

(No Model.)

Fig. 1.

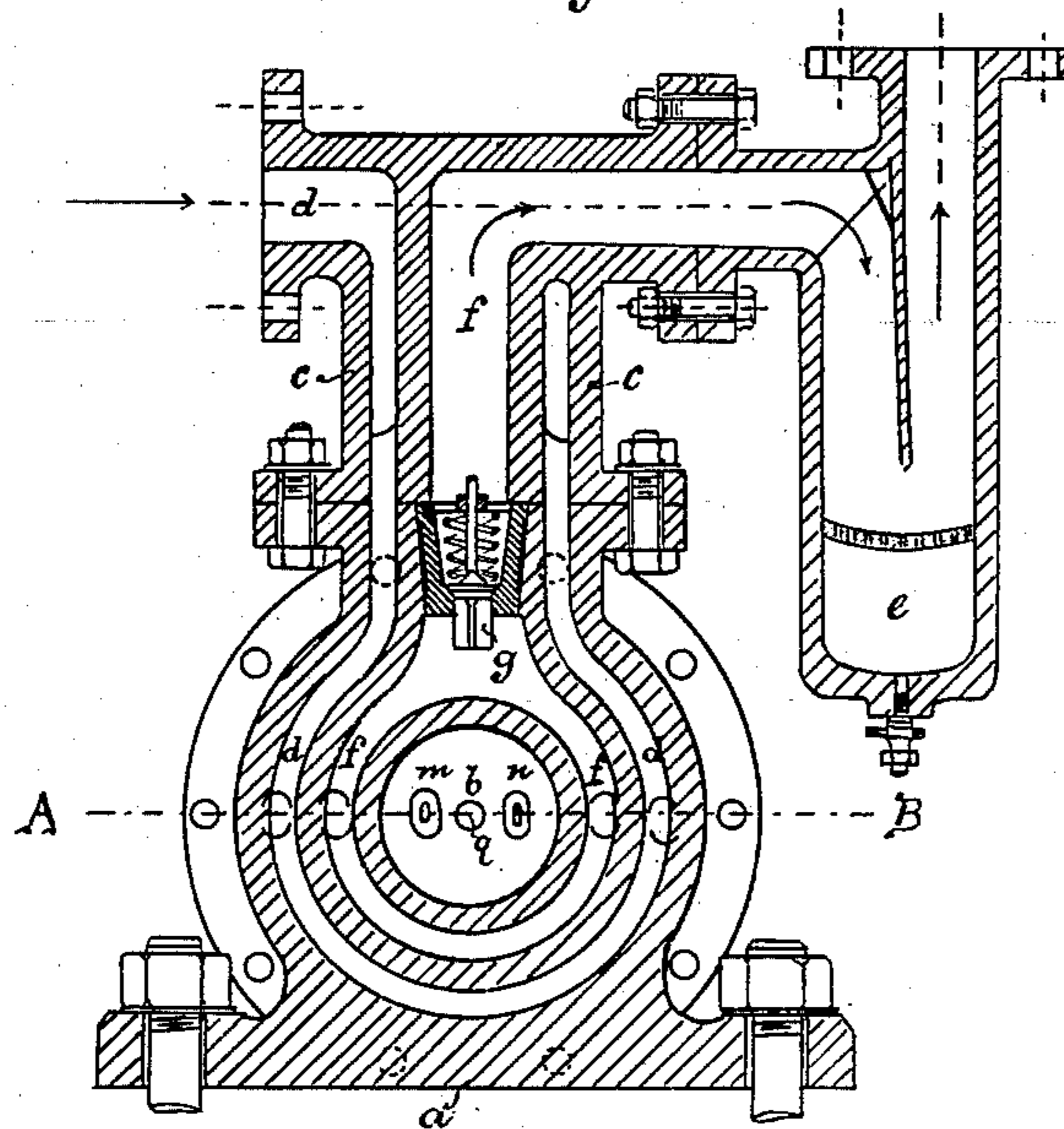
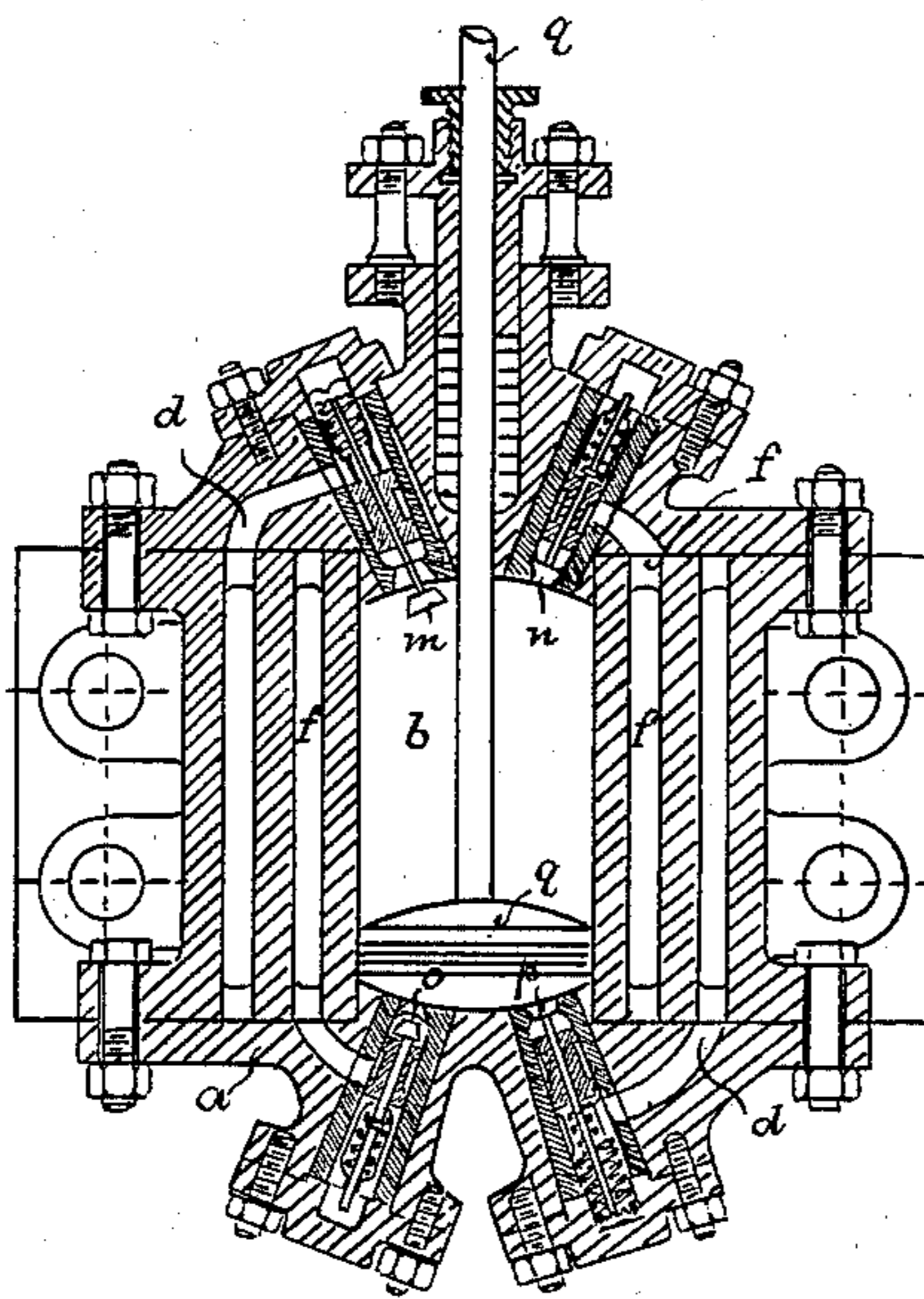


Fig. 2.



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# UNITED STATES PATENT OFFICE.

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## COMPRESSOR FOR REFRIGERATING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 655,120, dated July 31, 1900.

Application filed February 2, 1900. Serial No. 3,732. (No model.)

*To all whom it may concern:*

Be it known that I, HEINRICH RENNO, mechanic, of 132 Wellinghoferstrasse, Hoerde, Westphalia, in the German Empire, have invented Improvements in Compressors for Use with Refrigerating-Machines; and I do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention relates to an improved construction of compressor for use with refrigerating-machines, which allows the cold expanded gas coming from the expansion-chamber after effecting the refrigeration to be applied to the compressed, and therefore heated, gas from the compressor, thus obtaining an economy in the water required for cooling and also hastening the cooling process itself.

Referring to the annexed drawings, Figure 1 shows a vertical transverse section through the compressor cylindrical chamber, and Fig. 2 a horizontal section on the line A B of Fig. 1.

Upon the compressor-body *a* is arranged a cylindrical chamber *c*, the compression-cylinder *b* being, as shown at Fig. 1, horizontal and surrounded by two concentric jackets *d* and *f*. These latter are continued upward into the cylindrical chamber *c*, the inner one as an axial chamber and the outer one as an annular jacket around said chamber. The outer jacket *d* is connected with the expansion-chamber through the suction-pipe, while the upper-chamber portion of the inner jacket *f* is continued into an oil-compartment *e*, a spring-controlled lift-valve being arranged above the said jacket. The compressor is provided in the well-known manner with automatic valves *m n o p*.

The motion of the piston *g* causes the gas obtained by expansion in the expansion-chamber to be drawn through the outer jacket *d*, while the gas compressed by the piston is forced through the jacket *f*, adjacent to the compression-cylinder, and in a compressed condition driven into the upper chamber and thence to the pressure-pipe and the condenser. By the forward stroke of the piston, as drawn in Fig. 2, one valve *m* of the valves lying behind the piston will be lifted from its seat. The expanded gas in the outer jacket *d* will be drawn in and enter the compression-cyl-

inder *b* behind the piston *g*. Meanwhile the second valve *n* is closed. Of the two valves *o* and *p* in front of the piston this motion of the piston will open the former, while the valve *p* will be depressed upon its seating, so that the compressed gas will be forced to pass through into the jacket *f* and thence to the upper chamber of the latter before it can enter the pressure-pipe. By the backward stroke of the piston *g* the motion of the valves will be in the opposite direction. The outer or suction jacket will be closed by means of the valve *m*, while the inner or compression jacket will be put in communication through the open valve *n* with the compression-cylinder. The expanded gases will be drawn through the annular chamber *d* and the valve *p*, while the valve *o* will close the compression-jacket.

On its way to the pressure-pipe the compressed gas will be cooled by the expanded gas in the space *d*, so that it must part with a considerable portion of its heat before it enters the condenser, in consequence of which a much less intense refrigeration is required in the latter to accomplish the condensation of the gas. By suitably modifying the head *c*, and with it both the concentric spaces *f* and *d*, the cooling can be further increased.

By the employment of this invention considerable economy is effected as regards the water for cooling, and at the same time a more rapid refrigeration is obtained than was the case with former compressors.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

A compressor for refrigerating-machines having, arranged around the compression-chamber, two concentric jackets continued into the cylindrical chamber thereof as central and annular passages, the outer completing the communication with the suction-pipe and the inner that with the pressure-pipe, for the purpose of more intense cooling of the compressed outgoing gas by means of the expanded incoming gas.

In witness whereof I have hereunto set my hand in presence of two witnesses.

HEINRICH RENNO.

Witnesses:

OTTO KÖNIG,  
J. A. RITTERSHAUS.