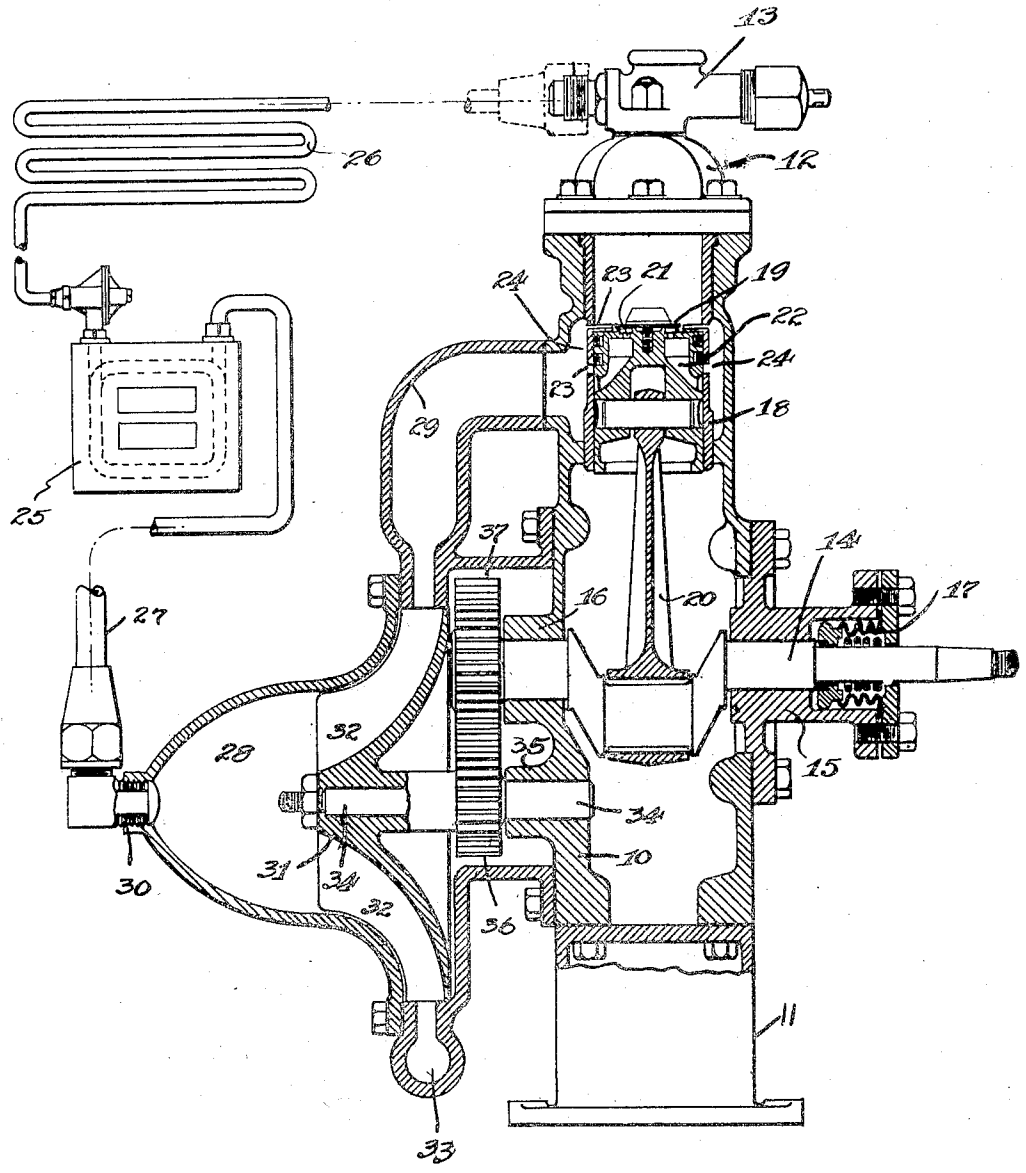
March 24, 1931. C. C. SPREEN 1,797,803

COMPRESSOR

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COMPRESSOR

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My invention relates to mechanical refrigerating systems, and more particularly to systems of the compressor-condenser-evaporator type.

An object of my invention is to increase the refrigerating capacity of refrigerating systems by providing a method of compressing the refrigerant prior to its entrance into the compressor.

A further object of my invention is to produce a maximum refrigerating capacity in mechanical refrigerating systems by the provision of mechanism for compressing expanded refrigerant prior to its entrance into the main compressor.

Another object of my invention is to precompress expanded refrigerant prior to entrance into the compressor of a mechanical refrigerating system by pump mechanism associated and operating in conjunction with the compressor.

Other objects of the invention, more or less incidental or ancillary to the foregoing will appear in the following description which sets forth in connection with the accompanying drawings a preferred embodiment of the invention.

In the accompanying drawings, I have illustrated a mechanical refrigerating system, partially in section and partially diagrammatically, with which is incorporated my invention.

Referring to the drawings in detail, 10 represents a compressor casing which is secured upon a base 11, the compressor having a head 12 provided with an outlet and a coupling 13 therefor. A crank shaft 14 extends transversely of the compressor casing, being mounted in bearings 15 and 16 through which they project, and being driven by a suitable source of power. A seal 17 is arranged to prevent leakage of refrigerant under pressure exteriorly of the casing through the bearing 15. The upper portion of the compressor casing is provided with a sleeve lining 18 within which a piston 19 is reciprocated by the crank shaft through the connecting rod 20. The piston is provided with inlet ports 21 through which refrigerant passes into the compression chamber thereabove, and ports 22 extend from the ports 21 through the sides of the piston. The sleeve 18 is provided with a plurality of ports 23, and the casing surrounding such ports is formed to provide a chamber 24 with which connection is made with an evaporator 25.

The outlet coupling 13 is connected with a condenser 26 which is in circuit with the evaporator. The system illustrated is of the conventional compressor-condenser-evaporator type of the dry type, however it could be constructed as the wet or flooded type for the application of my invention.

My invention is associated with the low pressure side of the refrigerating system, and the suction or return conduit is preferably constructed for such purpose. The return conduit comprises a piping 27 leading from the evaporator, a casing 28, an elbow 29 and a coupling 30 intermediate the piping and the casing. An end of the elbow is secured to the compressor casing and is in open communication with the chamber 24. The casing 28 is formed to provide a housing for the centrifugal pump 31, the rear end of which closes the rear end of the adjacent housing, and the outer side having projecting blades 32 which force the expanded refrigerant from the evaporator into an annular passage 33 leading to the elbow 29.

The pump is carried by a shaft 34 which is mounted in a bearing 35 in the compressor casing. A gear 36 is secured upon the shaft 34 and meshes with a gear 37 secured to the end of the crankshaft 14 extending through the bearing 16. The pump with its shaft will be driven through the gears from the crank shaft, thus operating simultaneously with the compressor.

Expanded refrigerant from the evaporator will be drawn through the pipe 27 into the casing 28 and will be initially compressed by the pump 31. The initially compressed refrigerant travels from the pump through the elbow 29 into the chamber 24 and thence through the ports 23, either directly into the compressor chamber or through the piston and into the compressor chamber.

The pump, initially compressing the expanded refrigerant prior to its entrance into

the compressor chamber, will increase the amount of refrigerant compressed by the compressor, and thus increase the refrigerating capacity of the system. The pump, it will be seen, provides a method of increasing the quantity of refrigerant delivered upon each stroke of the compressor, and therefore the refrigerating capacity of the system.

Various changes can be made in the structure herein described without departing from the spirit of the invention and the scope of the claims.

What I claim is:

1. In a mechanical refrigerating system, a two stage refrigerant compressing means comprising a unitary casing having a cylinder formed therein, a rotary pump within said casing to initially compress the vaporized refrigerant, a reciprocating piston within said cylinder to finally compress the initially compressed refrigerant delivered thereto from said rotary pump, means for driving said piston, and gear means connecting said piston driving means with said rotary pump to provide for driving said piston and said rotary pump from a single source of power.

2. In a mechanical refrigerating system, a two stage refrigerant compressing means comprising a casing having a cylinder formed therein, a rotary pump within said casing adapted to initially compress the vaporized refrigerant, a reciprocating piston within said cylinder to finally compress the initially compressed refrigerant delivered thereto from said pump, means for reciprocating said piston including a crank shaft, and a connecting rod, bearings in said casing to receive said crank shaft, one of said bearings being detachable as a unit, and gear means connecting said pump and said piston for operation from a single source of power.

3. In a mechanical refrigerating system, a two stage refrigerant compressing means comprising a casing having a cylinder formed therein, a rotary pump within said casing to initially compress the vaporized refrigerant, a reciprocating piston within said cylinder to finally compress the initially compressed refrigerant delivered thereto from said pump, means for reciprocating said piston including a crank shaft, and a connecting rod, bearings in said casing to receive said crank shaft, one of said bearings being detachable as a unit, resilient sealing means associated with said detachable bearing to form a gastight joint with said crank shaft, and gear means connecting said pump and said piston for operation from a single source of power.

4. In a mechanical refrigerating system, a two stage refrigerant compressing means comprising a casing having an enlarged side portion forming a refrigerant inlet chamber and an enlarged upper portion forming a cylindrical compression chamber and an annular refrigerant inlet passageway in communication therewith, means connecting the inlet chamber and the inlet passageway, a rotary pump within said inlet chamber to initially compress vaporized refrigerant, a reciprocating piston within said cylinder to finally compress the initially compressed refrigerant delivered thereto from said pump, and means for driving said pump and said piston from a single source of power.

5. In a mechanical refrigerating system, a two stage refrigerant compressing means comprising a casing having an enlarged side portion forming a refrigerant inlet chamber and an enlarged upper portion forming a cylindrical chamber provided with an annular recess adjacent its upper extremity, a sleeve provided with openings communicating with the said recess disposed in said cylindrical chamber, a rotary pump within the casing for initially compressing the refrigerant in the inlet chamber, a piston within the aforesaid sleeve for finally compressing the initially compressed refrigerant, means communicating with the inlet chamber for delivering the initially compressed refrigerant to the annular recess, and means for driving said pump and said piston from a single source of power.

In testimony whereof I hereunto affix my signature.

CHARLES C. SPREEN.