Feb. 13, 1923. 1,445,252

G. WEISS

COMPRESSOR

Filed June 4, 1920

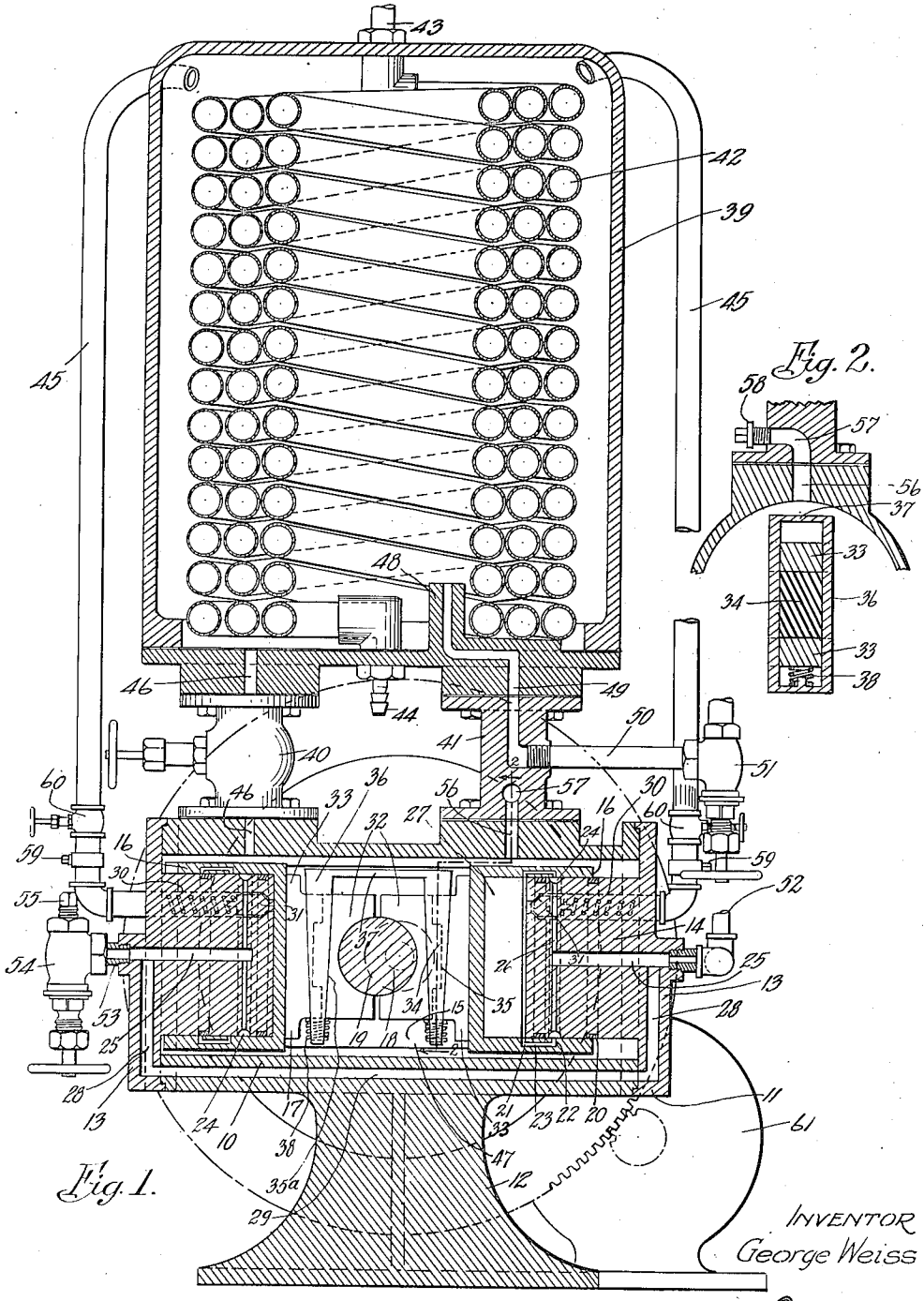


Fig. 1.

Fig. 2.

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GEORGE WEISS, OF CHICAGO, ILLINOIS.

COMPRESSOR.

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To all whom it may concern:

Be it known that I, GEORGE WEISS, a citizen of the United States, residing in the city of Chicago, county of Cook, State of Illinois, have invented certain new and useful Improvements in Compressors, of which the following is a specification.

The object of my invention is to simplify and cheapen the construction of refrigerating plants, to secure more noiseless operation and greater efficiency, and to make the use of ethyl-chloride and similar low-pressure refrigerating agents in ordinary refrigerating plants practical.

In drawings Fig. 1 is a partially sectional side-elevation of the compressor and condenser of a refrigerating plant of my construction, with necessary connections indicated; and Fig. 2 is a partial sectional view, at right angles to that of Fig. 1, in the plane indicated by line 2—2 in Fig. 1.

Referring to the drawings, my compressor 10 is composed mainly of a horizontal, cylindrical casting 11, with suitable base 12; piston heads 13, with pistons 14; frame 15 with cylinders 16, split sliding-block 17; and driving shaft 18 with eccentric 19, on which sliding-block 17 is mounted. Cylinders 16 fit closely over pistons 14 on which piston rings 20 are mounted. Each of cylinders 16 has cut into its inner surface annular grooves 21 and 22, which are connected with each other, at intervals, by channels 23; and each of pistons 14 is provided with circumferential grooves 24, central channels 25, and radial channels 26, connecting grooves 24 with channels 25. Grooves 21, 22 and 24 are disposed so that when a cylinder 16 has reached the end of its suction stroke, its groove 21 is located just within chamber 27, then formed between such cylinder 16 and the correlated piston 14, while at the same time its groove 22 is placed directly opposite correlated groove 24. Vertical channels 28 and horizontal channel 29 connect channels 25 with each other. Suitable channels 30 lead from the outer ends of piston-heads 13 to the inner faces of pistons 14 and accommodate suitable discharge valves 31. Split sliding-block 17 is mounted in frame 15 and on eccentric 19 in the usual way, but is of novel construction in that each half thereof consists of two portions 32 and 33, one of which has a horizontal projection 34 which extends, with a close sliding fit, into corresponding horizontal groove 35 in the opposite portion, and in that, at the lines of cleavage between portions 32 and 33 tapering vertical grooves 35[a] of suitable depth are provided, on each side of portions 32 and 33, into which wedge-shaped members 36 of a yoke 37 are drawn, with a moderate, but steady pull, by compression springs 38. Above compressor 10 my condenser 39 is mounted on top of valve 40 and member 41. In condenser 39 are provided cooling coils 42, with inlet 43 and outlet 44, through which water or other cooling fluid is circulated. The interior of condenser 39, around coils 42, is connected at the top by means of pipes 45 with channels 30, and at the bottom by channel 46, controlled by valve 40, with chamber 47, formed between piston-heads 13 in casting 11. From the top of a boss 48, rising from the bottom of condenser 39, channel 49 leads by way of pipe 50, controlled by valve 51, to the expansion valve and the refrigerating coils (not shown in the drawing), from which a return pipe 52 leads to one of channels 25; the other channel 25 being connected by a nipple 53 to an elbow valve 54, the free end of which is upturned and closed by screw-plug 55. Chamber 47 is connected by vertical channel 56 with horizontal channel 57, which is closed by screw-plug 58. Pipes 45 are provided, as near to piston-heads 13 as practicable, with plugs 59 and, immediately above them, with globe-valves 60.

My device is used and functions as follows: After all parts are properly adjusted, valves 40, 54 and 60 being opened, I remove screw-plugs 55 and 58, rotate shaft 18 by an electric motor 61 or other appropriate means and pour glycerine into the opening above valve 54. The glycerine thereupon will be drawn through channels 25, 26 and 23, into chambers 27, and from there will be projected through channels 30 and pipes 45 into condenser 39, whence it will run, through channel 46, into chamber 47, the air from chamber 47, escaping through channels 56 and 57 until the glycerine will finally begin to run from the opening of channel 57. I thereupon replace screw-plug 58 so as to close channel 57, and continue the injection of glycerine into my apparatus until the bottom of condenser 39 is covered with glycerine to about half the height of boss 48. I thereupon close valve 54, and globe-valve 60, and remove plugs 59, until the air in my refrigerating apparatus is ex-

hausted therefrom as far as practicable, the air being drawn by the action of cylinders 16, by way of pipe 52 and channels 25, 26, 23, 28 and 29 from the refrigerating coils, and further, by way of tube 50 and channel 49, from condenser 39, and the channels connected therewith, and being forced out through channels 30, to the lower portions of tubes 45, and the opening for plugs 59. As soon as a proper vacuum has been created in this manner, I re-insert plugs 59 tightly in place and thereupon pour liquid ethyl-chloride into the opening above valve 54, which I thereupon open to permit the drawing of the ethyl-chloride into my machine by way of channels 25, and connecting channels 28, 29, 26 and 23. The ethyl-chloride will thereupon be projected in the same way as previously the glycerine, through channels 30 and pipes 45 into my condenser 39, and will float on top of the glycerine therein until the lower portion of the condenser is filled with liquid ethyl-chloride, which thereupon will escape as needed, through channel 49, and tube 50, to the expansion valve and refrigerating coils; whence in turn it will be drawn through pipe 52 and channels 25 and connecting channels into the compression chambers of my compressor; whence it will again be projected, in the manner above shown, into condenser 39, to be there again liquified by the combined action of compression and cooling.

Any glycerine, which during the operation of my machine penetrates into the compression chambers, is automatically projected, together with the ethyl-chloride gas, through channels 30 and pipes 45, into condenser 39, and there, being heavier than the ethyl-chloride liquid, settles to the bottom of the condenser and unites with the supply of glycerine kept there as a reserve supply for chamber 47. On the other hand any ethyl-chloride, either gas or liquid, which may find its way into chamber 47, will automatically rise to the top of that chamber and thence escape through channel 46, and the superimposed glycerine, into that part of condenser 39, which is filled with ethyl-chloride.

It will thus be seen that the arrangement of my machine serves to continually separate in an automatic manner the ethyl-chloride which is used as refrigerating agent, from the glycerine which is used as lubricating agent. It will further be seen that by the construction of my machine, I make superfluous the use of inlet-valves in my compressor, and thereby do away with one of the most fruitful sources of compression-trouble, and simplify construction. At the same time I attain an automatic adjustment of split sliding-block 17 with reference to frame 15, as well as with reference to eccentric 19;—any wear of portions 32 and 33, where they contact with frame 15 and eccentric 19, being automatically compensated by the spreading apart of members 32 and 33 through the wedging of members 34 into grooves 35^a.

It is plain that the construction of my device may be changed in many particulars without departing from the essential features of my invention. All such changes I intend to cover.

I claim:

1. In a fluid-compressor, the combination of a fixed piston containing a valve-controlled outlet for the compressed fluid, and having on its circumference a depression connected with an inlet for the fluid; a movable cylinder fitting over, and co-operating with the fixed piston, and provided on its inner surface with a depression arranged to communicate with the depression on the circumference of the piston at the end of the suction-stroke of the piston, with another depression adapted to open into the compression chamber at the end of the suction stroke of the cylinder, and with channels connecting said depressions; and means of support, guidance and actuation; substantially as and for the purpose set forth.

2. In a fluid-compressor, the combination of a fixed piston containing a valve-controlled outlet for the compressed fluid, and having on its circumference a depression connected with an inlet for the fluid; a movable cylinder fitting over, and co-operating with, the fixed piston, and provided with a channel adapted to connect the depression on the circumference of the piston with the compression chamber at the end of the suction stroke of the cylinder; and means of support, guidance and actuation; substantially as set forth.

GEORGE WEISS.