

June 29, 1926.

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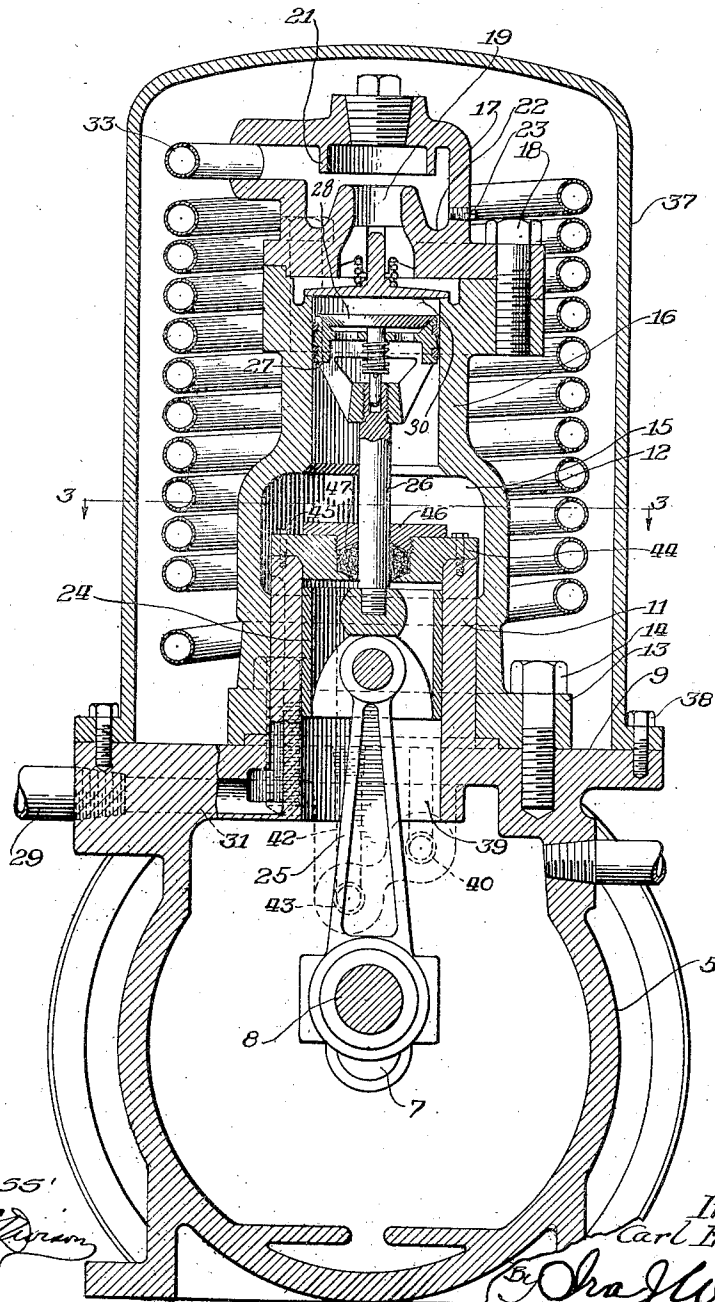
C. E. L. LIPMAN

COMPRESSOR

Filed Jan. 12, 1924

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Fig. 1.



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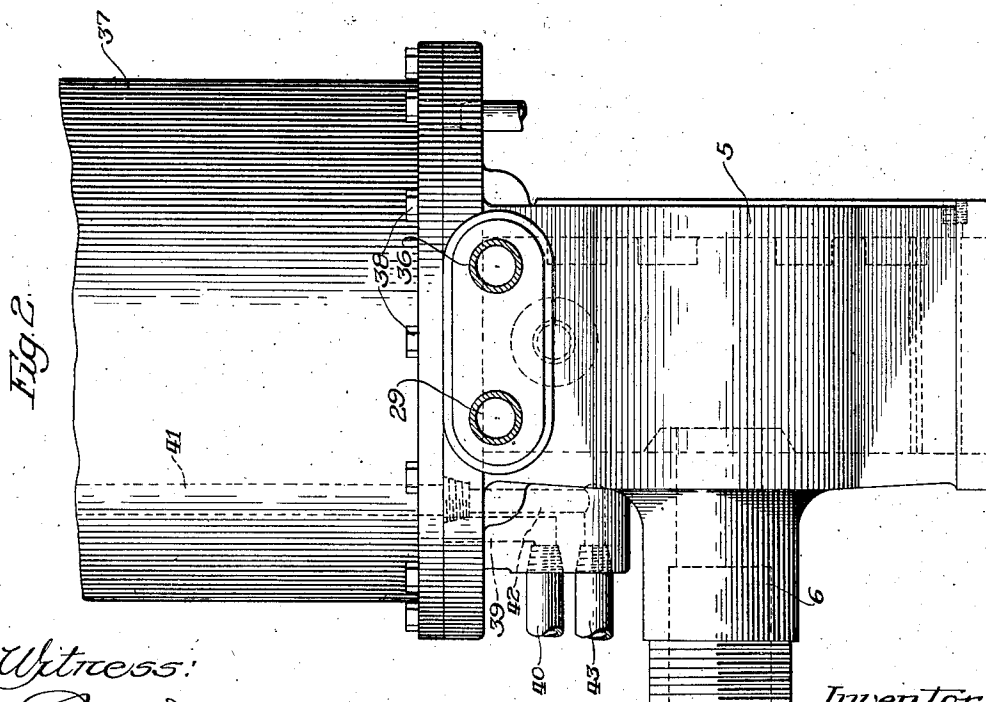
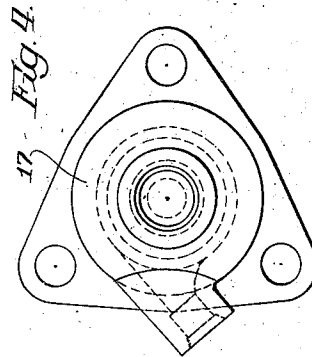
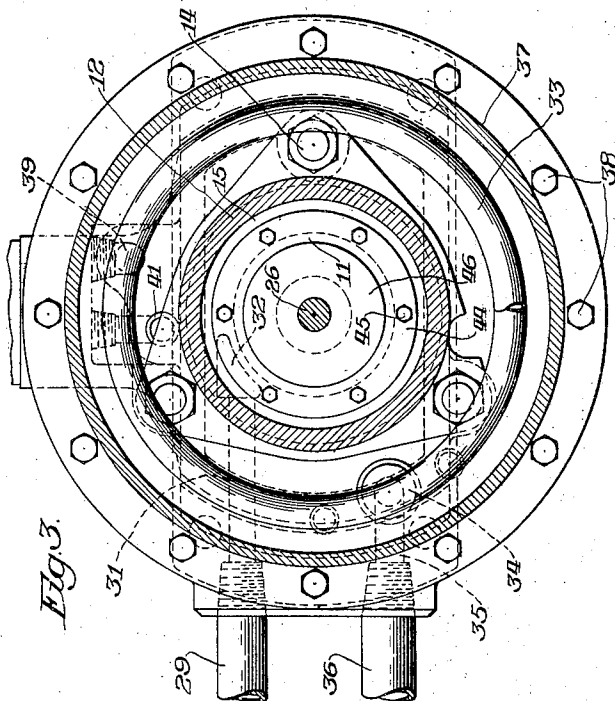
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COMPRESSOR

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UNITED STATES PATENT OFFICE.

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COMPRESSOR.

Application filed January 12, 1924. Serial No. 685,743.

This invention relates in general to compressors; and while the principles of my invention may be embodied in compressors adapted for many purposes, the form of compressor herein illustrated is designed particularly as an ammonia compressor suitable for use in refrigerating apparatus.

One of the primary purposes of this invention is to provide a compressor which will be compact in structure and capable of being economically manufactured and assembled, and which shall be so constructed that it will be strong, durable and efficient in use, and at the same time is capable of being quickly dismantled for purposes of inspection or repairs.

Another object of the invention is to provide a compressor which will separate from the compressed ammonia leaving the cylinder any oil which may be carried along therewith, and which will cause the separated oil to accumulate in a trough or groove, from which it may be drained at intervals.

Other objects and advantages of this invention should be readily appreciated as the same becomes better understood by reference to the following description, when considered in connection with the accompanying drawings.

Referring to the drawings:—

Fig. 1 is a vertical sectional view through a compressor embodying my invention;

Fig. 2 is a fragmentary side elevation thereof looking toward the right at Fig. 1;

Fig. 3 is a sectional view on the line 3—3 of Fig. 1; and

Fig. 4 is a plan view of the cylinder head.

Referring now to the drawings more in detail, reference character 5 indicates generally the crank case of my improved compressor, provided with a bearing 6 in which is journaled the crank shaft 7 provided with a crank 8. The upper portion of the crank case is shaped to provide a flat shelf 9, from the center of which projects upwardly a cylindrical crosshead guide 11.

A cylindrical block 12 is shaped to provide a hollow base portion adapted to slidingly embrace the perimeter of the guide 11, by which it is steadied, the base being provided with a flange 13 resting upon the shelf 9 and securely attached thereto by a series of fastening bolts 14.

Immediately above the guide 11 the cyl-

inder block is cored out to provide a chamber 15, and above this chamber it is restricted to form the cylinder proper 16. A cylinder head 17 is secured to the top of the cylinder block by bolts 18, and this head is interiorly shaped to provide a restricted passage 19 leading from the cylinder and adapted to discharge into a compartment or chamber formed within a pending flange or apron 21. Around the passage 19 and in vertical alignment with the apron 21, a collecting trough to groove 22 is formed in the cylinder head to receive any oil which may be delivered from the cylinder and which is separated from the compressed ammonia delivered, by the apron 21, from which said oil drips into the groove 22. A removable drain plug 23 affords provision for draining off the collected oil when desirable.

Within the crosshead guide 11, a cylindrical crosshead 24, is disposed and is adapted to be reciprocated longitudinally by a connecting rod 25 connecting the crosshead with the crank 8. A piston rod 26, extending upwardly from the crosshead, is connected at its upper end with a piston 27, reciprocable in the cylinder 16 and provided with a valve 28, past which the ammonia, or other medium to be compressed, flows from the chamber 15 into the cylinder above the piston and from thence through the usual outlet valve 30 to the condenser coil 33. The ammonia returning from the refrigerating coils through a return pipe 29, flows through a passage 31 cored in the upper portion of the crank case into a vertically extending passage 32, formed by opposed grooves extending longitudinally upon the inner face of the cylinder block and the outer face of the crosshead guide 11, as best shown in Fig. 3.

From the upper end of this passage, the returning refrigerating medium enters the chamber 15, and then upon the downward stroke of the piston 27 flows past the valve 28 into the cylinder above the piston so that upon the upward stroke of the piston this medium is compressed. From the cylinder head the medium flows past the valve 30 and through the condenser coil 33, comprising a series of convolutions surrounding the cylinder block, the lower end of the coil being connected to an upwardly extending boss 34, which communicates

through a passage 35, cored in the upper portion of the crank case, with a pipe 36 leading to the ammonia receiver.

Cooling of the compressor and the condenser coils is effected by a water jacket formed between the perimeter of the cylinder block and a cap or shell 37, which sets down over the coils and is secured at its bottom to the shelf 9 by a series of fastening bolts 38. The water enters the bottom of the jacket through a passage 39 connected at its lower end with a supply pipe 40, and rising in the jacket overflows near the top thereof through an overflow pipe 41, which is connected by a passage 42 with the water delivery pipe 43.

In order to prevent leakage of ammonia from the chamber 15 into the crank case, and also for the purpose of precluding oil from working upwardly past the crosshead into the chamber 15, a packing gland snugly embracing the piston rod 26 is provided. By reference to Fig. 1 it will be observed that this gland comprises a member 44 secured by bolts 45 to the top of the guide 11, and a packing nut 46 threaded into the member, between which and the member the packing 47 is compressed around the piston rod.

In the operation of my improved compressor, the medium to be compressed is drawn into the chamber 15 through the pipe 29 and passages 31 and 32 upon the upstroke of the piston, and at the same time the medium above the piston is compressed and forced outwardly into the condenser coil 33. Any oil which may be carried by the medium is separated therefrom in the cylinder head and is collected in the groove 22. Water flowing into the water jacket from the pipe 40 circulates around the cylinder and the condenser coils, finally overflowing through pipe 41 and being delivered by pipe 43.

It is believed that the construction, operation and many of the attendant advantages of my invention will be understood and appreciated from the foregoing without further description, and while a preferred embodiment is shown and described, obviously the structural details may be varied within wide limits without departing from the essence of the invention, as defined in the following claims.

I claim:—

1. In a compressor, the combination of a crank case provided with an upwardly extending cylindrical crosshead guide, a cylinder block comprising a base surrounding said guide and secured to the crank case, a suction passage formed by opposed grooves in said guide and cylinder block, and means operable within said block for compressing the medium entering through said passage.

2. In a compressor, the combination of a

crank case provided with an upwardly extending cylindrical crosshead guide, a cylinder block comprising a base surrounding said guide and secured to the crank case and a restricted portion above said guide forming the cylinder proper, a hollow cylinder head provided with an internal oil collecting groove, a suction passage communicating with the interior of said cylinder block beneath said cylinder proper, a delivery pipe communicating with the interior of said cylinder head, a crank in said crank case, a crosshead operable thereby, a piston in said cylinder, and a connection between said piston and said crosshead.

3. In a compressor, the combination of a crank case provided with an upwardly extending cylindrical crosshead guide, a crosshead reciprocable in said guide, a cylinder block embracing said guide and provided above the guide with a cylinder proper, a piston in said cylinder connected with said crosshead, a packing gland mounted upon the upper end of said guide and embracing the piston rod, a suction passage formed in the walls of said guide and said block, a hollow cylinder head, and means therein for separating and collecting oil delivered from said cylinder with the compressed medium.

4. In a compressor, the combination of a crank case formed to provide an upwardly extending cylindrical crosshead guide, a cylinder block supported by said crank case and surrounding said guide, a cylinder head mounted on said block, water inlet and delivery passages formed in said crank case and communicating with a water jacket around said block, a delivery passage formed in the crank case and with which the delivery end of said coil communicates, and a suction passage formed by opposed grooves extending longitudinally of said guide and said cylinder block.

5. In a compressor, the combination of a crank case, a cylinder block supported thereby, a cylinder head mounted upon said block and provided with oil separation and collection means, a piston reciprocable in the cylinder block, a piston rod, a packing gland surrounding said rod and carried by said crank case, and a suction passage provided in said crank case and said block through which communication is established with said cylinder.

6. In a compressor, the combination of a crank case provided with an upwardly extending crosshead guide, a cylinder block comprising a base surrounding said guide, and a cylinder proper above the guide, a suction passage communicating with the interior of said block below the cylinder proper, and means operable within said block for compressing the material entering through said passage.

7. In a compressor, the combination of a crank case, a cylinder block supported thereby, a cylinder head provided with oil separation and collection means, a piston reciprocable in the cylinder block, a suction passage communicating with the interior of the block below said piston, a piston rod and a packing gland surrounding said rod whereby the cylinder is sealed from the crank case.
- 5 8. In a compressor, the combination of a crank case, a crosshead guide projecting upwardly therefrom, a cylinder block having its lower portion surrounding said guide and its upper portion bored to provide a cylinder, a cylinder head provided with oil separation and collection means, a piston 15 in said cylinder, a piston rod extending downwardly therefrom into said guide, a crosshead to which the lower end of said rod is connected, and a packing gland surrounding said rod between said crosshead 20 and said piston.

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