W. J. BOLAND.

GAS COMPRESSOR.

APPLICATION FILED APR. 11, 1908.

920,421.

Patented May 4, 1909.

2 SHEETS—SHEET 1.

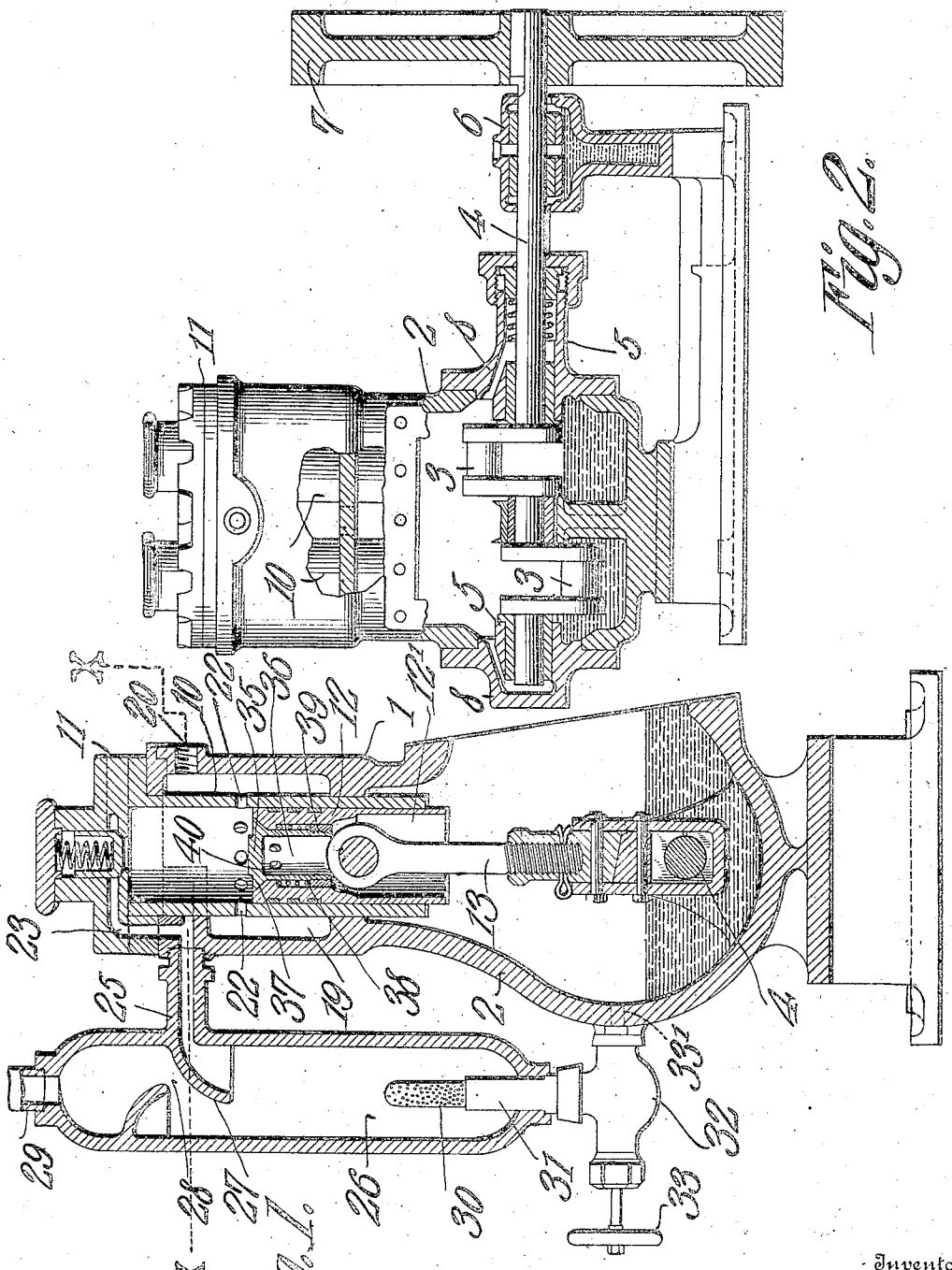

Fig. 2.

Fig. 1.

Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

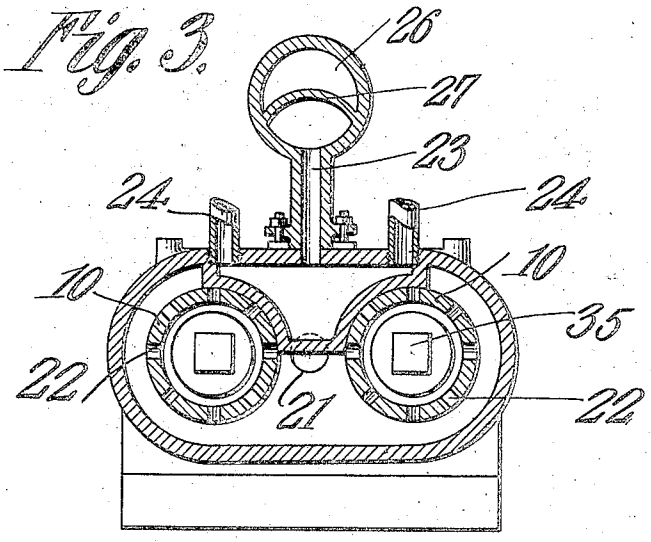
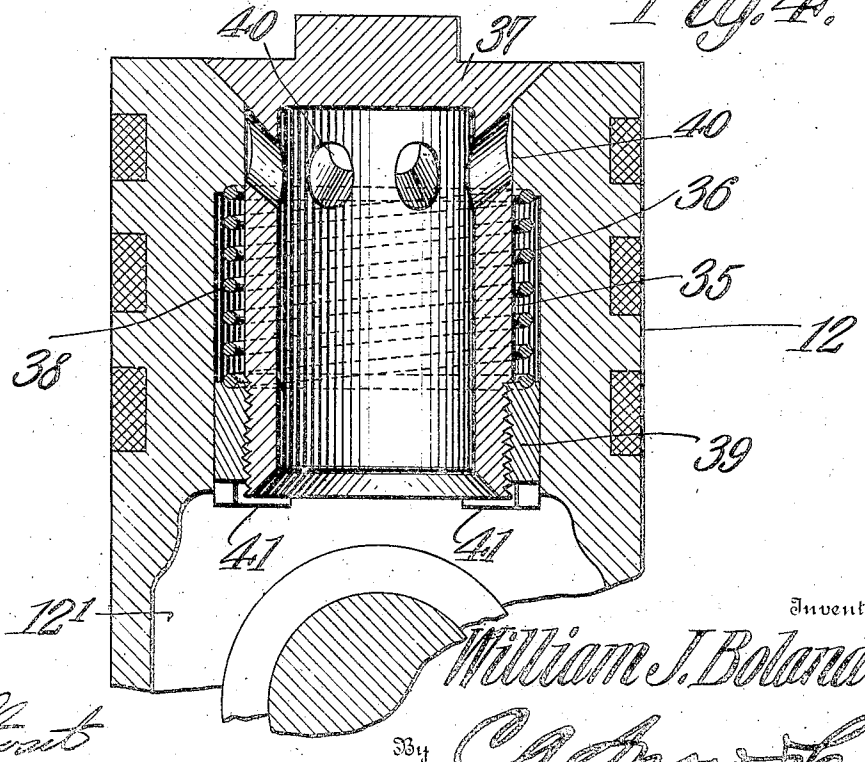


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM J. BOLAND, OF CHICAGO, ILLINOIS.

GAS-COMPRESSOR.

No. 920,421. Specification of Letters Patent. Patented May 4, 1909.

Application filed April 11, 1908. Serial No. 426,602.

To all whom it may concern:

Be it known that I, WILLIAM J. BOLAND, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Gas-Compressor, of which the following is a specification.

This invention relates to gas compressors used for refrigerating purposes, and has for its object to provide a new and improved gas compressor and oil separator by means of which not only is the structure of the compressor improved and made more efficient, but, also, by means of which the surplus lubricant may be saved.

The invention consists of a gas compressor and details thereof constructed and arranged as herein set forth and claimed.

Referring to the drawings, in which similar numerals represent like parts, Figure 1 is an elevation in vertical section of a gas compressor and oil separator constructed in accordance with this invention. Fig. 2 is a side view, partly broken away, in section showing a part of the operating mechanism of the compressor. Fig. 3 is a plan view in horizontal section on the line x—x of Fig. 1. Fig. 4 is a detail enlarged view in vertical section of the admission valve carried by the piston.

In the construction of the device forming the subject of the present invention, the casing 1 is provided with a crank chamber 2, in which is mounted a shaft 4 having cranks 3. The shaft is supported by bearings 5 within the crank case, and an external bearing 6 carried by a hollow pedestal or standard 8. On the outer end of the shaft is a belt wheel 7.

Mounted in the upper part of the casing 1 are two cylinders 10 formed with the head portions 11 bolted to the casing 1 so as to be removable therefrom. In each of said cylinders 10 is mounted a trunk piston 12 having its lower end provided with the hollow portion 12′ opening into the crank chamber 2. The pistons 12 are connected to the cranks by rods 13. Surrounding a portion of the cylinder 10 is a gas inlet or receiving chamber 19, into which gas from refrigerating pipes enters through the inlet port 20 in the casing 1. The chamber 19 communicates by means of a port 21 (Fig. 3) with the crank chamber 2. In the wall of the cylinder 10 are piston controlled inlet ports 22 through which passes the gas from the chamber 19 into the cylinder when the piston reaches the limit of its downward stroke. The upper end of the cylinder communicates with a discharge chamber 23, the compressed gas raising a spring closing valve 24 on the up stroke of the piston and passing into said chamber. From the discharge chamber leads a port 25 to an oil separator 26 having a baffle 27 adjacent to the mouth of the port for directing the gas and oil downward into the separator chamber 26. The separator chamber 26 is provided with outlet passages 28 and 29 leading to a condenser to which the gas discharging through said passages is carried.

30 is a strainer or sieve mounted on a vertical pipe 31 located in the bottom of the separating chamber 26 and communicating with a valve chamber 32 normally closed by a valve, 33 which is operated by a hand wheel, said valve chamber 32 communicating by a port 33′ with the crank chamber 2.

The upper end of the piston 12 is provided with an admission valve 35 arranged in a chamber 36 opening into the chambered lower portion of the piston 12′ which communicates with the crank chamber 2. The valve 35 is provided with a tapering head 37 seated in a corresponding tapering portion in the top of the piston 12. To accelerate the closing of the valve, it is surrounded with a compression spring 38, and at the lower end of said valve is a retaining nut 39 which fits the lower surface of the valve chamber, and, also, serves as a guide for the lower end of the valve. The wall of the upper end of the valve is provided with outlet ports 40 which, when the valve is lifted, form communicating ports between the upper end of the cylinder and the crank chamber.

The operation of the device is as follows:—The gas returning from the refrigerator pipes to the compressor enters through the inlet port 20 into the receiving chamber 19, and thence into the crank chamber 2 through the port or opening 21 (Fig. 3.) When the piston moves on its down stroke the valve 27 is raised from its seat by the pressure of the gas in the crank chamber, this being assisted by the partial vacuum formed in the upper portion of the cylinder as the piston descends. As the valve lifts, the ports 40 are opened allowing the gas to enter the cylinder from the crank casing. On the arrival of the piston at the bottom of its stroke, it has uncovered the ports 32 which allows the gas in the receiving chamber 19 to enter and fill the

upper part of the cylinder. This gas is compressed and discharged during the upward stroke of the piston. The gas so discharged lifts the valve 24 and passes into the discharge chamber 23, and thence through the port 25 into the oil separating chamber 26. The gas passes up through the passage-ways 28 and 29 and is conducted to the condenser. The oil passing downward is strained and filtered through the strainer 30 and passes into the pipe 31, the sediment being deposited at the bottom of the chamber about the pipe 31. By opening the valve 33 the oil passes from pipe 31 through port 33′ into the crank chamber 2 owing to the superior pressure in the separating chamber.

What is claimed is:—

1. In combination, a gas compressor provided with a crank chamber, a gas inlet chamber in communication with the crank chamber, a cylinder having inlet ports connecting with said inlet chamber, a piston controlling said ports, a vertically movable valve carried by the piston and having ports for placing the crank chamber in communication with the upper end of the cylinder, a discharge chamber communicating with the cylinder, an oil separator in communication with the discharge chamber, and a valved passage between the lower portion of the separator and the crank chamber.

2. In combination, a gas compressor provided with a crank chamber, a gas inlet chamber in communication with the crank chamber, a cylinder having inlet ports connecting with said inlet chamber, a piston controlling said ports, a vertically movable valve carried by the piston and having ports for placing the crank chamber in communication with the upper end of the cylinder, a discharge chamber communicating with the cylinder, an oil separator in communication with the discharge chamber, an oil strainer arranged in the lower portion of the separator, and a valved passage between the lower portion of the separator and the crank chamber.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

WILLIAM J. BOLAND.

Witnesses:

THOMAS J. BRADLEY,

JOHN E. DALEY.