April 7, 1931. S. SMITH 1,799,539

ROTARY COMPRESSOR

Filed April 2, 1929 2 Sheets-Sheet 1

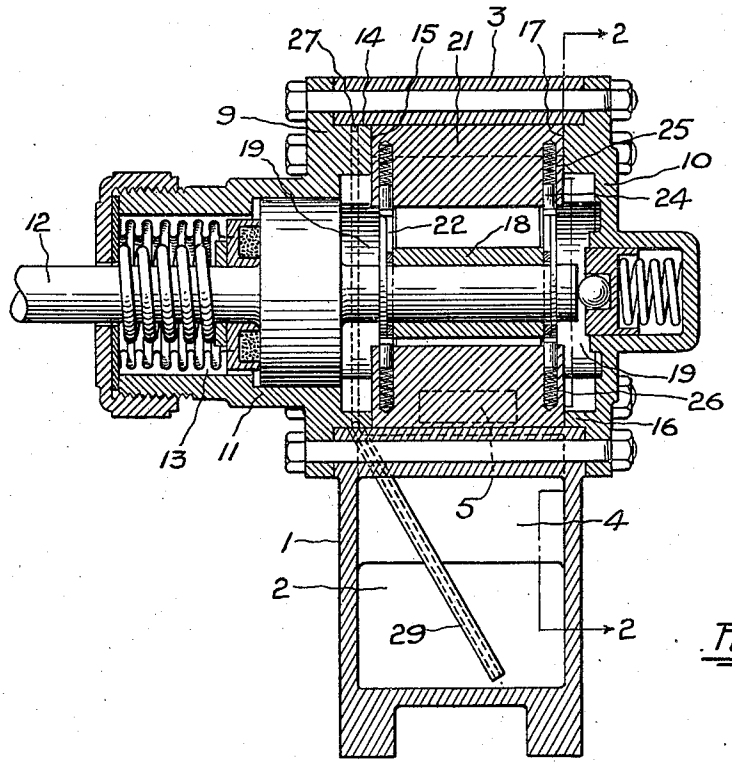


Fig. 1

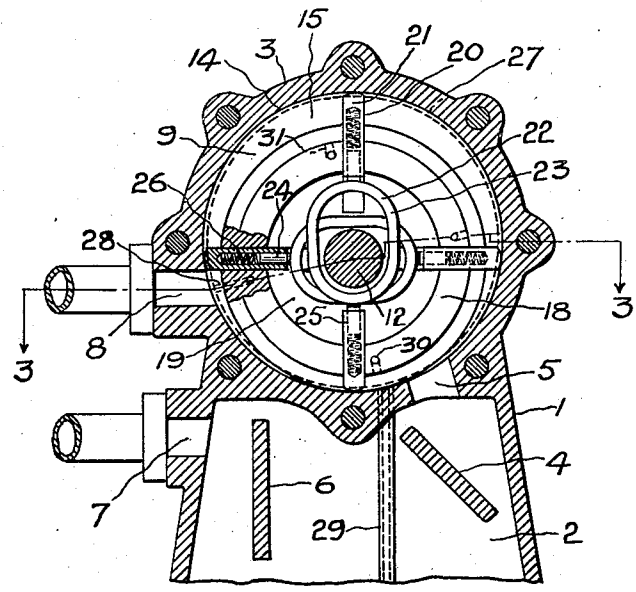


Fig. 2

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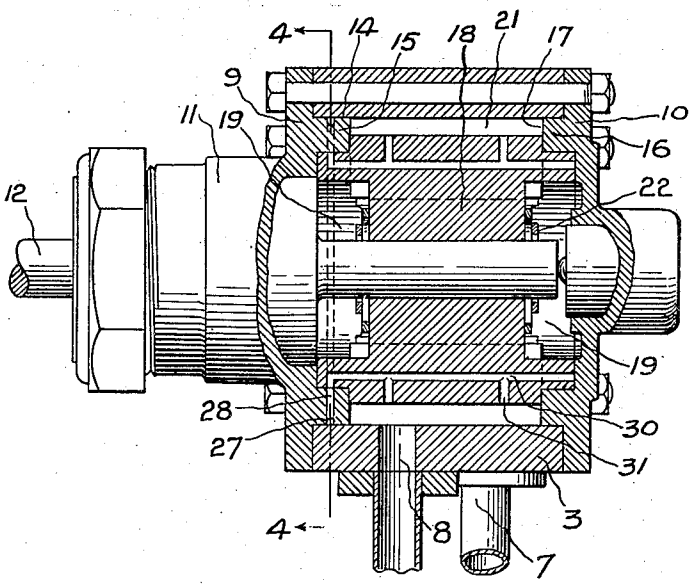


Fig. 3

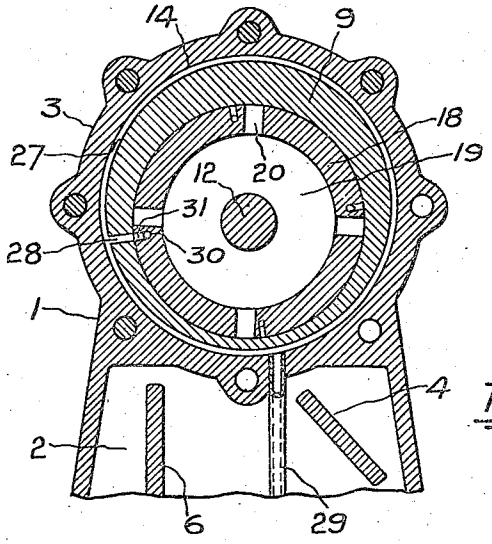


Fig. 4

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Patented Apr. 7, 1931 1,799,539

UNITED STATES PATENT OFFICE

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ROTARY COMPRESSOR

Application filed April 2, 1929, Serial No. 351,998, and in Canada November 27, 1928.

My invention relates to improvements in rotary compressors which are particularly adapted for compressing gases such as methyl chloride, butine and the like. The objects of the invention are to provide a supply of lubricant to the working parts, which will vary according to the resistances developed during the compression, so that when the compressor is working under light load, a small supply of oil is used and when working under a heavy load, the supply of oil is proportionately increased. A further object is to provide means whereby the lubricant is readily separated from the fluid delivered from the compressor, so that the said fluid or gas, carried through to the condenser or other apparatus, is free from finely divided lubricant, thus relieving the said apparatus of work which it is not designed to do.

The invention consists essentially of a rotary compressor having a casing partially surrounded by an oil separating chamber, and a duct between the separator and the casing whereby the pressure developed by the compressor is adapted to deliver oil therefrom to the working parts within the said casing, as will be more fully described in the following specification, and shown in the accompanying drawings, in which:—

Fig. 1 is a longitudinal sectional view of the invention.

Fig. 2 is a transverse sectional view taken on the line 2—2 of Figure 1, showing the rotor in end elevation.

Fig. 3 is a part plan view taken on the line 3—3 of Figure 2.

Fig. 4 is a transverse sectional view taken on the line 4—4 of Figure 3.

In the drawings like characters of reference indicate corresponding parts in each figure.

The numeral 1 indicates a standard consisting of a base or separator chamber 2 in which the oil or other lubricant used in the compressor is collected and an open ended casing or cylinder 3. The separator chamber is fitted with an inclined baffle plate 4 adjacent a discharge port 5 which communicates between the casing 3 and the chamber 2, and a further baffle plate 6 adjacent an outlet port 7 which is remote from the discharge port 5, so that the gas and oil delivered into the chamber is caused to follow an irregular path in its flow to the outlet that the globules of oil may fall by gravity from the gas stream. The casing 3 is provided with an inlet port 8 approximately 120 degrees from the discharge port. The casing is fitted with a pair of heads numbered 9 and 10 which are bolted thereto in the usual manner. The head 9 is provided with an eccentrically disposed boss 11 which is bored to accommodate a driven shaft 12 and a suitable gland 13. The inner end of the head 9 is formed with a spigot projection 14 and with an inner face 15. The head 10 is provided also with a spigot projection numbered 16 and an inner face 17. Secured to the shaft 12 is a rotor 18 having concentric recesses 19 at both ends and having pairs of radial slots 20 which are adapted to receive a plurality of slidable blades 21. These blades are maintained in contact with the inner periphery of the casing by spacers generally indicated by the numeral 22. The spacers 22 consist of an elongated loop 23 fitted within the recesses 19 of the rotor about the driven shaft 12, and are provided at each end with a pin 24.

The blades 21 are provided with recesses or pockets 25 formed in their inner edges which are each adapted to receive a spring 26 which abuts the end of one of the pins. Since the casing 3 is cylindrical and the rotor is eccentrically mounted therein, it will be obvious that the distance from one peripheral wall of the casing to the other taken horizontally through the axis of the rotor will be less than the distance from wall to wall taken vertically through the said axis, so that the springs 26 must be provided to hold the outer edge of each pair of blades in sealing contact with the peripheral walls of the casing. It will also be apparent that by forming the spacers in this manner the required spring expansion is reduced to a minimum and the shaft is bridged by the loops 23, thus avoiding the transverse piercing of the shaft and the consequent weakening thereof which would be required if straight pins were used such as are commonly employed.

The outer periphery of the spigot projection 14 is provided with a groove 27 which for simplification of machining, extends therearound and directed inwardly therefrom, at a point adjacent the inlet port 8 is an oil passage 28, see Figure 3, the purpose of which will hereinafter appear. Communicating with the groove is an oil feed pipe 29, see Figure 1, which extends downwards into the separator chamber 2 and through which oil is forced by the gas pressure developed in the compressor. Immediately to the rear of each of the blades 21 a passage 30 is formed longitudinally of the rotor which is intersected by one or more radial passages 31 extending from the outer periphery of the rotor, one end of each of the passages 30 being so disposed as to register intermittently with the passage 28 in the spigot projection of the head 9, so that as the shaft 12 is rotated each passage 30 is brought into register with the passage 28, a quantity of oil from the separator chamber is forced outwards through the passages 31 into the casing 3 to lubricate the several moving parts.

It will be noted that the several oil passages in the rotor come into register with the passage 28 only when adjacent to the intake port, so that the oil flow therethrough is assisted also by the negative pressure prevailing on the suction side of the compressor. The oil so delivered into the casing is carried therearound by the blades 21 and is ultimately discharged into the separator chamber 2, with the gas compressed where it is separated therefrom ready for reuse.

It will thus be seen that the delivery of oil to the casing 3 is so regulated as to provide ample lubrication, which is increased in quantity as the compression load increases.

What I claim as my invention is:

1. In a rotary compressor, a casing having an inlet and discharge port, a rotor eccentrically mounted therein, reciprocal blades carried by the rotor for contact with the inner periphery of the casing, said casing having an annular oil receiving groove adjacent one end, including an offset branch opening into the casing adjacent the inlet port thereof, an oil supply pipe communicating with said groove, said rotor having spaced longitudinal oil receiving bores arranged behind said blades, and adapted to singly register with said offset branch of the annular groove, and radially disposed bores leading from the first mentioned bores to the periphery of the rotor, whereby oil is intermittently supplied to the periphery of the rotor during the suction periods.

2. In a rotary compressor, a casing having an inlet and discharge port, heads closing the ends of said casing, and each formed with an annular recess on the inner side thereof, a rotor eccentrically mounted within the casing, reciprocal blades carried by said rotor, each blade having spaced radial bores, springs located therein, loops surrounding the shaft of the rotor and arranged in said recesses, and pins projecting from the ends of each loop and received by the bores of the adjacent blades, whereby said springs are compressed to maintain said blades in effective engagement with the inner periphery of the casing.

Dated at Vancouver, B. C., this 13th day of March, 1929.

SIDNEY SMITH.