A. P. ANDERSON.

COMPRESSOR.

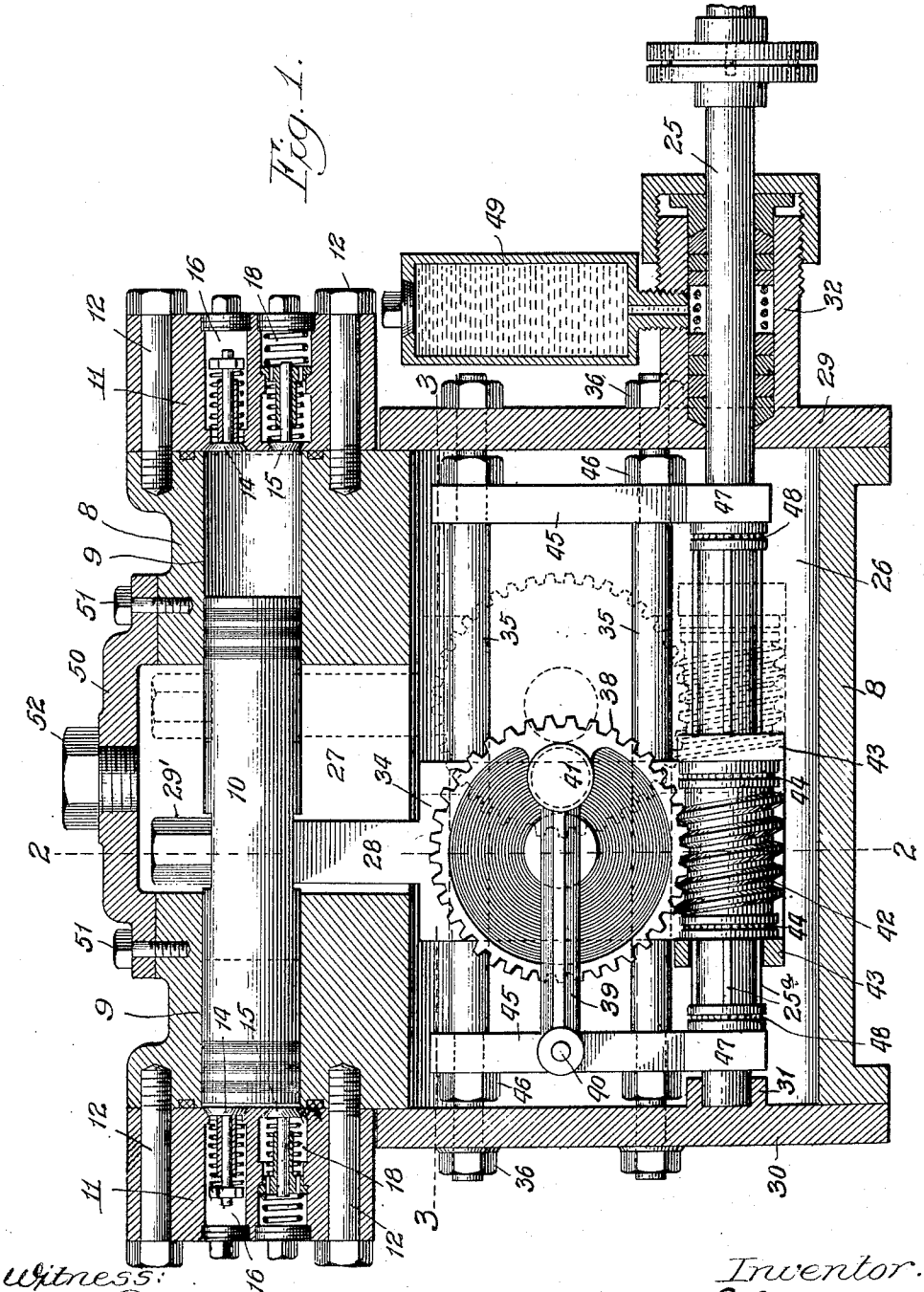
APPLICATION FILED AUG. 1, 1917.

1,368,598.

Patented Feb. 15, 1921.

2 SHEETS—SHEET 1.

Fig. 1.



Witness:
John Enders

Inventor:
August P. Anderson
by Fred Gerlach
his Atty.

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2 SHEETS—SHEET 2.

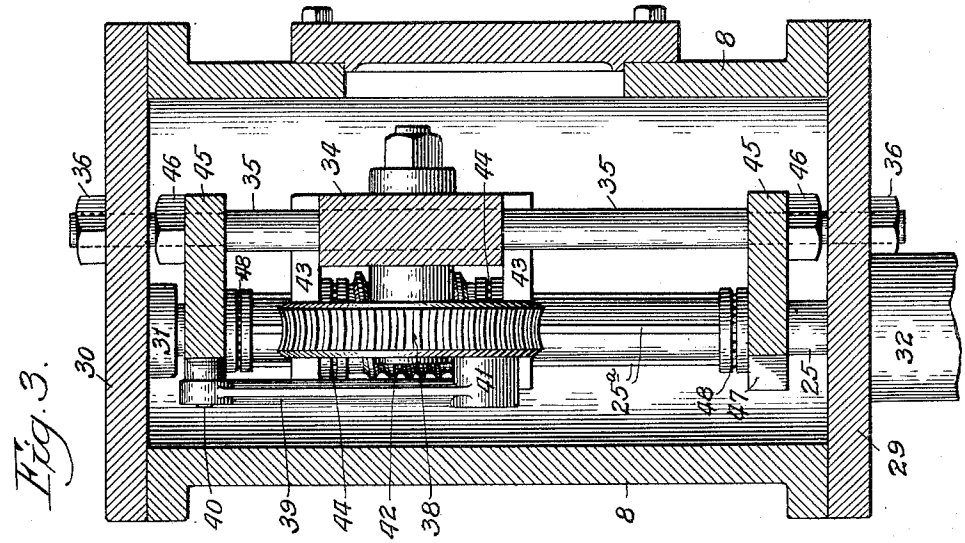


Fig. 3.

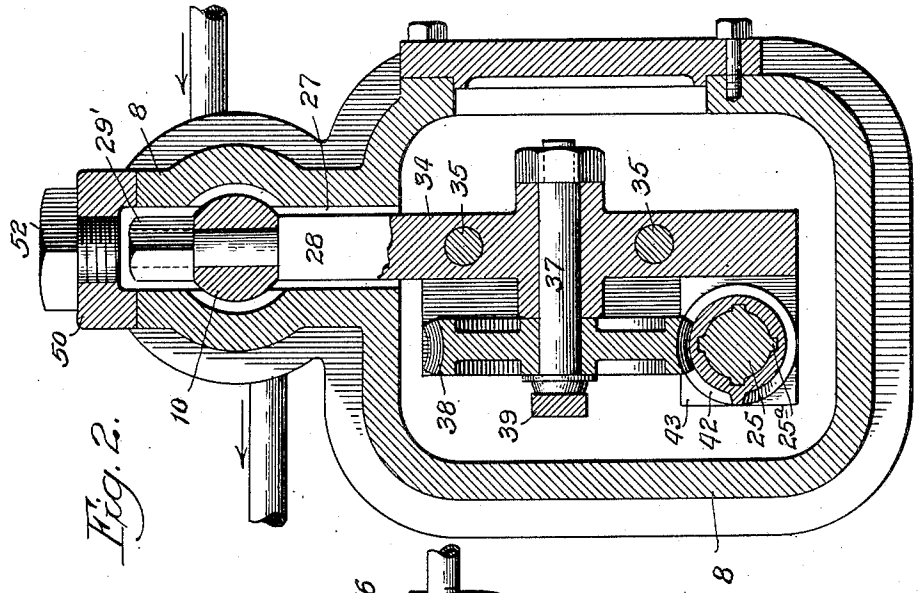


Fig. 2.

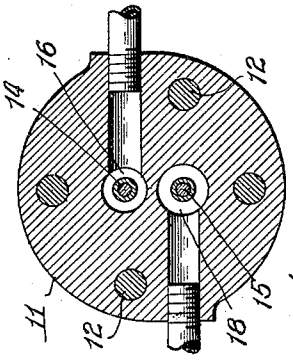


Fig. 4.

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UNITED STATES PATENT OFFICE.

AUGUST P. ANDERSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO ANDERSON-REES REFRIGERATING MACHINE CO., OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

COMPRESSOR.

1,368,598. Specification of Letters Patent. Patented Feb. 15, 1921.

Application filed August 1, 1917. Serial No. 183,846.

To all whom it may concern:

Be it known that I, AUGUST P. ANDERSON, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Compressors, of which the following is a full, clear, and exact description.

The invention relates to compressors.

One object of the invention is to provide a compressor which is adapted to be operated by a high speed or electric motor and in which combined gearing for reducing the speed of the shaft and for translating rotary into rectilinear motion is contained in a casing forming a part of or in close association with the compressor casing.

Another object of the invention is to provide an improved compressor in which pistons are operated by a cross-head which moves in a rectilinear path parallel to and laterally of the axes of the cylinders, so that an alined pair of cylinders may be located closely together with the oppositely working pistons therein.

Other objects of the invention will appear from the following description.

The invention consists in the several novel features hereinafter set forth and more particularly defined by claims at the conclusion hereof.

In the drawings: Figure 1 is a vertical section of a compressor embodying the invention. Fig. 2 is a section taken on line 2—2 of Fig. 1. Fig. 3 is a section taken on line 3—3 of Fig. 1.

The compressor comprises a casing 8 containing a pair of alined cylinders 9 in which is slidably mounted an operating member 10, the ends of which operate in and serve as pistons for the cylinders 9 respectively. At the outer end of each cylinder 9, a valved head 11 is secured by bolts 12. Each head 11 contains a spring-closed inlet-valve 14 and a spring-closed outlet-valve 15. The fluid to be compressed, such as air, gas or refrigerant is delivered by suitable pipes into a chamber 16 containing the valve 14. The chambers 18 adjacent the valves 15 are connected by suitable piping to the place of storage or consumption. This construction exemplifies one in which reciprocation of the operating member 10 between alined cylinders will simultaneously cause one piston to draw a charge of fluid into one of the cylinders while the other piston is compressing the fluid in the other cylinder and discharging it therefrom.

A drive shaft 25 is mounted in parallel relation to the working member 10, in the heads 29 and 30 at the ends of the casing 8. The latter is provided with a chamber 26 to contain the gearing for operating the pistons from the shaft 25. A chamber 27 is formed in the wall of the casing between chamber 26 and the cylinders, to form a working space for a stud 28 which is secured by a nut 29′ to the central portion of the operating member 10. Shaft 25 extends through gearing-member 26, has its inner end mounted in a bearing 31 on the head 30 and extends through a bearing and stuffing box 32 in the head 29. Chamber 26 is adapted to contain lubricant so that the reducing gearing in the compressor case will travel in oil and so that the lubricant will be splashed onto the working member 10. Stud 28 is secured to one side of sliding cross-head 34 by bolts 33. Said cross-head is mounted to slide upon stationary rods 35, the ends of which are secured in heads 29 and 30 by nuts 36.

The mechanism for operating the sliding cross-head from the shaft 25, comprises a worm 42 mounted on shaft 25 and caused to rotate with said shaft by ribs 25^a and slidable on the shaft. This worm is caused to reciprocate with the cross-head 34 by laterally projecting lugs 43 between which the worm is held. Ball-bearings 44 are interposed between the ends of the worm 42 and lugs 43 to minimize friction. Thrust bearings 48 are provided for shaft 25 to minimize friction due to the longitudinal stresses applied thereto. The gear 38 is mounted on a shaft 37 carried by the cross-head 34 and is movable bodily and longitudinally with the cross-head and rotatable relatively thereto. A link 39 has one of its ends pivoted, as at 40, to the casing, and its other end is eccentrically pivoted, as at 41, to the gear 38. Bars 45 extend between and are secured to the guide rods 35 by nuts 46 and the lower ends of these bars are provided with laterally offset lugs 47 for the anti-friction thrust bearings 48 by which the shaft 25 is held

against longitudinal movement. Rods 35 may be adjusted longitudinally by means of nuts 36 at the outer ends thereof. An oil reservoir 49 supplies lubricant to the bearing 32. A cap 50 is secured by bolts 51 to the top of the casing 8 above the chamber 27 to provide access to the nut 29. A filling plug 52 is provided in the cap 50.

In operation, rotation of the shaft 25 will rotate the worm 42. The shaft 25 is usually driven at a high speed directly from an electric motor and the worm meshing with the gear 38 will cause the gear to rotate slowly. Rotation of the gear 38 will, by reason of its eccentric connection 41 with the link 39, cause the gear and the cross-head 34 to reciprocate on the rods 35. This rectilinear movement of the cross-head will be imparted through stud 28 to the operating member 10 and the pistons 9 at the ends thereof. As the cross head slides, its lugs 43 will operate the worm 42 longitudinally on the shaft 25 to maintain driving engagement between the worm and the gear 38.

It will be observed that the reducing gearing and the chamber which contains it are disposed along side of the cylinders, as contra-distinguished from between them or endwise thereof. This construction makes it possible to bring the cylinders and the reducing gearing into small compass so that a comparatively small casing will inclose the gearing and pistons. This is of particular advantage in domestic refrigerating systems where little space is available.

The invention exemplifies a compressor in which operating cranks and pitman connections between the cranks and the pistons are dispensed with; in which reducing gearing is contained within the compressor casing adapted to contain lubricant, is utilized to directly operate the piston; in which there is confined in close association, a reducing gearing with the pistons; and in which the reducing gearing and compressor are unitarily embodied.

The invention is not to be understood as restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a compressor, the combination of a casing provided with a cylinder, a piston slidably working in the cylinder, a high speed shaft extending into said casing and reducing gearing between the shaft and the piston disposed in the casing and along side of the cylinder.

2. In a compressor, the combination of a casing provided with a cylinder and a chamber, a piston slidably working in the cylinder, a high speed shaft substantially parallel with the axis of the cylinder and extending into said chamber and reducing gearing between the shaft and the piston, comprising a worm and gear disposed along side of the cylinder and in said chamber.

3. In a compressor, the combination of a casing provided with a cylinder, a piston slidably working in the cylinder, a high speed shaft extending into said casing and reducing gearing contained in the casing and between the shaft and the piston, and comprising a bodily movable worm and gear.

4. In a compressor, the combination of a casing provided with a cylinder, a piston slidably working in the cylinder, a high speed shaft extending into said casing, a cross-head slidably mounted in the casing and connected to the piston, and reducing gearing between the shaft and the cross-head, comprising a bodily moving worm and gear and a link between the gear and the casing.

5. In a compressor, the combination of a casing provided with a cylinder, a piston working in the cylinder, a slidable cross-head connected to and traveling with the piston, a drive shaft, and means for operating the cross-head from the drive-shaft, comprising a worm and gear, and means operated by the gear for imparting longitudinal movement to the cross-head and worm.

6. In a compressor, the combination of a casing provided with a cylinder, a piston working in the cylinder, a slidable cross-head connected to and traveling with the piston, a drive shaft, and means for operating the cross-head from the drive-shaft, comprising a worm gear and a link connected to the gear and for imparting longitudinal movement to the cross-head and worm.

7. In a compressor, the combination of a casing provided with a pair of alined cylinders and a chamber along side of said cylinders, a reciprocable compressor member having pistons at its ends working in the cylinders respectively, a high speed shaft extending into said chamber, and reducing gearing between the shaft and said member disposed in said chamber and along side of the cylinders.

8. In a compressor, the combination of a casing provided with a pair of alined cylinders, a reciprocable compressor member having pistons at its ends working in the cylinders respectively, a high speed shaft for driving said member, reducing gearing between the shaft and the piston mounted in the casing, comprising a bodily movable

worm, and gear, and means for reciprocating said worm and gear.

9. In a compressor, the combination of a casing provided with a pair of alined cylinders, a reciprocable compressor member having pistons at its ends working in the cylinders respectively, a high speed shaft for driving said member, reducing gearing between the shaft and the piston mounted in the casing, comprising a cross-head reciprocating with said member, a gear mounted on the cross-head, a worm on said shaft and reciprocable with the cross-head, and means operated by said gear for reciprocating the cross-head.

AUGUST P. ANDERSON.