

March 12, 1935.

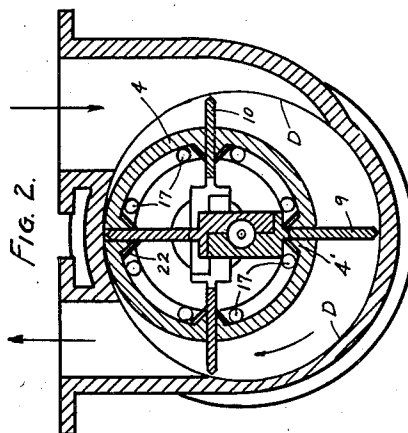
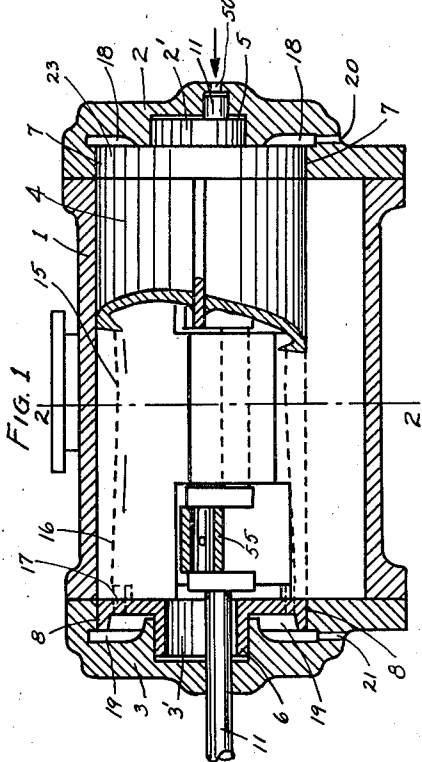
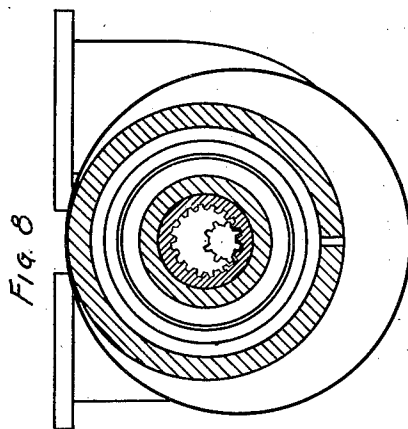
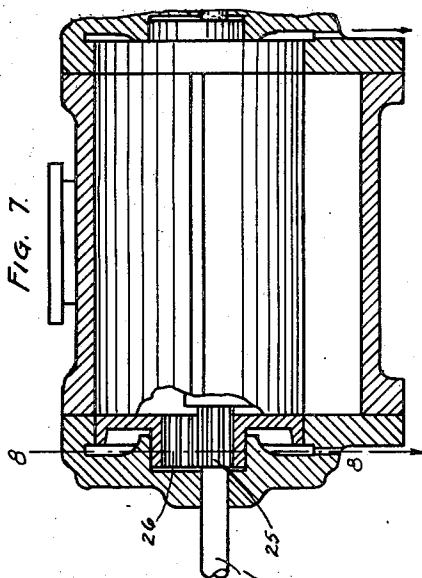
J. O. GETTE, JR

1,994,245

COMPRESSOR AND SUPERCHARGER

Filed Sept. 3, 1931

2 Sheets-Sheet 1



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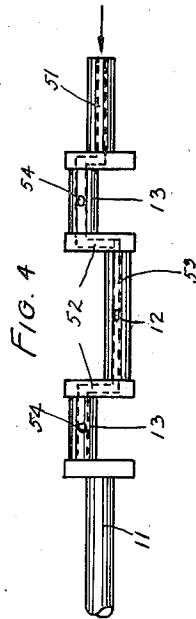
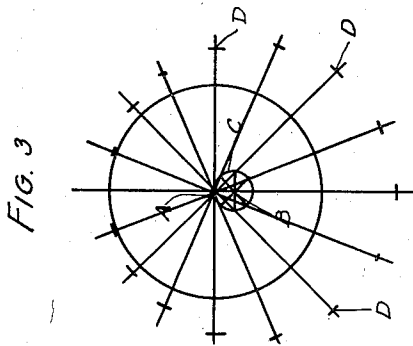
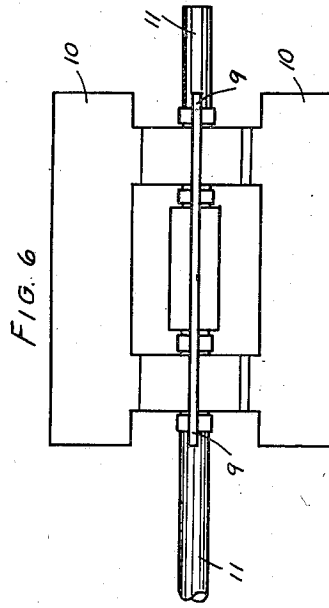
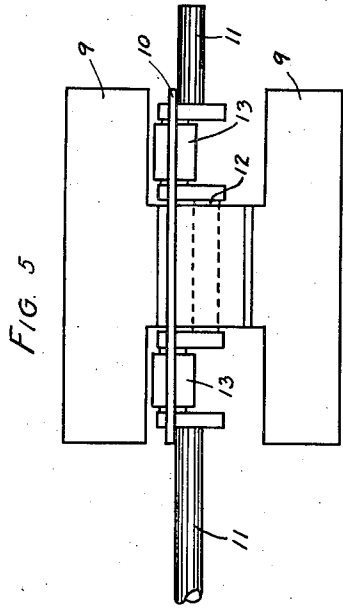
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COMPRESSOR AND SUPERCHARGER

Filed Sept. 3, 1931

2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE

1,994,245

## COMPRESSOR AND SUPERCHARGER

John O. Gette, Jr., Yonkers, N. Y.

Application September 3, 1931, Serial No. 560,918

4 Claims. (Cl. 230—157)

This invention relates to compressors and superchargers of the rotary vane or crescent type.

The object of the invention is a compressor of this type wherein constant clearance is maintained between the blades and the casing and the dynamic forces of the moving parts are effectively balanced. A further object of the invention is a compressor of this type including novel and improved driving means. A still further object of the invention is a compressor of this type having novel and improved means for lubricating the moving parts and for preventing the escape of the lubricating fluid with the compressed gas. Still further objects of the invention will hereinafter appear.

For a better understanding of the invention reference may be had to the accompanying drawings wherein:

Fig. 1 is a longitudinal cross section of a compressor containing one embodiment of the invention;

Fig. 2 is a transverse cross sectional view along the line 2—2' of Fig. 1;

Fig. 3 is a layout of the casing curvature;

Fig. 4 is a view of the crank shaft drive;

Figs. 5 and 6 are views of the crank shaft rotary vane assembly; and

Figs. 7 and 8 are views showing the preferred method of drive.

Referring to the drawings, I have shown my invention as embodied in a compressor having a casing generally of cylindrical form, this casing comprising a central drum part 1 and two end parts 2 and 3, these three parts of the casing being secured together in any suitable manner to form a unitary casing. The curvature of casing 1 will be referred to more particularly hereinafter.

The two end parts 2 and 3 of the casing are provided with recesses 2' and 3' within which are journaled the ends of a rotating cylinder or drum 4, the ends 5 and 6 being of reduced diameter and journaled in any suitable manner within the recesses 2' and 3' respectively. The drum or cylinder 4 is made longer than the cylindrical portion 1 of the outer casing and projects into the end parts 2 and 3 and forms air seals with the shoulders 7 and 8 of the end casing parts 2 and 3. The drum or cylinder 4 is slotted between its ends to receive the rotating vanes or blades 9 and 10, which blades reciprocate back and forth within these slots as the cylinder or drum 4 is rotated. These blades are carried by and driven by a crank shaft 11, the latter passing through the drum or cylinder 4 and being journaled within the two end parts 2 and 3 of the outer casing. The blades

10 and 11 are carried directly by and journaled directly upon the crank shaft, one of these blades 9 being mounted on the central crank pin 12 and the other blade 10 being journaled upon and supported by the crank pins 13. Each blade is made into two mating parts as indicated for ready assembly upon the crank pins and they are cut away at their central portions, as indicated in the drawings, so as to clear each others paths of movement.

Referring particularly to Fig. 3 the central axis of the rotating drum or cylinder 4 is indicated at A. The axis of the crank shaft 11 is indicated at B and the circle C indicates the path of movement of the crank pins 12 and 13 about the crank shaft axis B. It is observed that this path C passes through the axis A of the drum or cylinder 4 or, in other words, the crank shaft 11 is displaced from the axis A one-half of the distance of the total throw of a crank pin upon passing through 180°. A curve through the points D of Fig. 3 gives the curvature of the eccentric casing part 1 for constant clearance of the identical blades 9 and 10 as they are driven by the crank shaft. This curve is determined by laying off radii equal to one-half the total blade length from the crank pin centres and passing through the rotating cylinder center. The instantaneous centers of the crank pins determine the center of the blades and these points along with the center of the rotating cylinder determine the angular position of the vanes.

The interior surface of the drum 4 is formed of a sloping character from the point 15 towards the ends so as to have inclined surfaces 16 to guide the oil towards the ends of the cylinder out through the openings 17 into the oil chambers 18 and 19 of the end casing parts 2 and 3, oil escape openings 20 and 21 being indicated as leading from these chambers 18 and 19. Oil scrapers or rollers may be provided upon or adjacent the cylinder vane bearings 4', such for example as indicated at 22, so as to further reduce the oil loss. The lubrication may be effected by introducing the oil under pressure through suitable openings in the crank shaft or any other suitable lubricating system may be employed. I have indicated somewhat diagrammatically in Figs. 1 and 4 passages for supplying lubricant to the crank shaft. These passages comprise a passage 50 in the end housing member 2 for supplying lubricant to the end of the crank shaft. The latter is provided with a passage 51, 52, 53 for distribution of the lubricant into the crank shaft. Each throw 12 and 13 of the crank shaft is provided

with a radial opening 54 for supplying lubricant to the bearing members 55 where the oil is eventually squeezed out into the rotary drum and the lubricant is then led out by the sloping walls 16 to the ends of the drum as above described.

To assemble the machine the vanes are assembled upon the crank shaft pins and then the cylinder which is made in four segmental parts with closing end plates 23 is assembled around the vanes and the crank shaft, and the crank shaft and rotating drum or cylinder as thus assembled and forming the entire moving mechanism is slid from one end into the casing and the remaining casing end plate is then fastened in position. The details of fastening the cylinder parts together are omitted for convenience.

The centrifugal and dynamic forces are very easily and effectively balanced with this construction. The rotating drum 4 is, of course, balanced because it rotates on its central axis and the mass thereof may be easily distributed for perfect balance. The rotating vanes 9 and 10 are carried by crank pins disposed at 180° from each other on the crank shaft and the dynamic forces resulting from the rotation of the vanes may be perfectly balanced through the crank shaft. The crank shaft rotates at twice the speed of the drum or cylinder 4.

The drive may be effected entirely by applying power to the crank shaft 11 or by applying power to the drum or cylinder with the crank shaft rotating freely, but the preferred method of drive is that shown in Figs. 7 and 8 wherein both the crank shaft 11 and the cylinder are positively driven by power. The crank shaft 11 carries a drive pinion 25 which meshes with an internal gear 26 formed on the internal periphery of the hollow end 6 of the drum. The pitch line of the pinion 25 coincides with the circle C of Fig. 3 and the internal gear 26 has twice the diameter of the pinion, namely, the pinion having half the number of teeth that the internal gear 26 has.

This method of drive positively rotates the crank shaft 11 and drum 4 simultaneously and in the proper speed ratio. This construction prevents buckling and deflection of the vanes 9 and 10 and permits a lighter construction of these vanes and also the bearings and crank shaft itself and renders possible higher rotational speeds. This method of drive gives a three-point support for each vane in every position and gives an added stiffening effect to the entire rotating structure.

The periphery of the cylinder forms in effect the fulcrum point of the projecting blades, see for example Fig. 2 wherein the lower end of vane 9 and the two ends of the blade 10 are at that point in the cycle projecting beyond the cylinder.

The particular construction shown, wherein the cylinder is driven from the crank shaft through the pinion 25 and the internal gear 26, has the advantage of being very compact, no extra bearings or shafts being required. The drive through the internal gear is desirable over the spur gear in that a quieter and smoother drive is effected, and more tooth surface is active.

This application is in part a continuation of my application Serial No. 544,972 filed June 17, 1931.

I claim:

1. A compressor of the type having a rotating drum and reciprocating rotary blades, means for supplying lubricant to the moving parts and said drum being provided with a sloping internal peripheral surface for guiding lubricant therefrom, and means for collecting said lubricant as it leaves the rotating drum.

2. A compressor having a stationary casing and a rotating drum with reciprocating rotary blades therein, means for supplying lubricant to the moving parts, said rotating drum being provided with a sloping internal peripheral surface for guiding lubricant therefrom and openings in the end wall thereof for the escape of said lubricant and said stationary casing having a chamber into which the said openings lead for collecting said lubricant as it leaves the rotating drum.

3. A compressor having an outer casing and a relatively rotating drum with reciprocating rotary blades therein, means for supplying lubricant to the moving parts, said relatively rotary drum being provided with means for guiding the lubricant from the center towards the ends thereof and having openings leading therefrom for the escape of said lubricant, said outer casing having chambers at the ends of the relatively rotary drum to which said openings lead for collecting the lubricant from the rotating drum.

4. A compressor of the character set forth in claim 2 wherein the stationary casing is eccentrically mounted with respect to the rotating drum and the lubricant is supplied to the moving parts within the rotating drum.

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