May 19, 1925. 1,538,754

G. J. SPOHRER

ELECTRIC MOTOR DRIVEN COMPRESSOR

Filed June 30, 1923 2 Sheets-Sheet 1

Fig. 2.

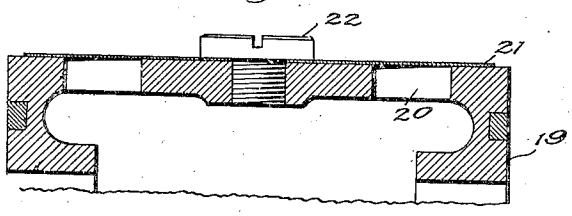


Fig. 3.

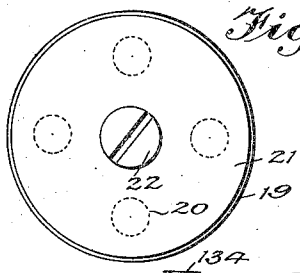


Fig. 4.

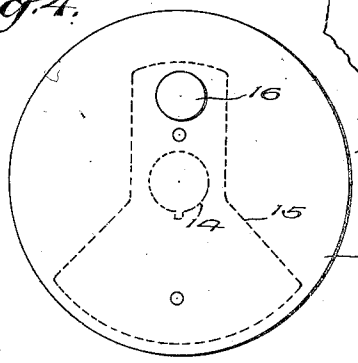


Fig. 5.



Fig. 1.

WITNESSES

Geo. W. Naylor

T. L. McAuliffe

INVENTOR

Gregory John Spohrer

BY Mitchell & Co.

ATTORNEYS

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Fig. 6.

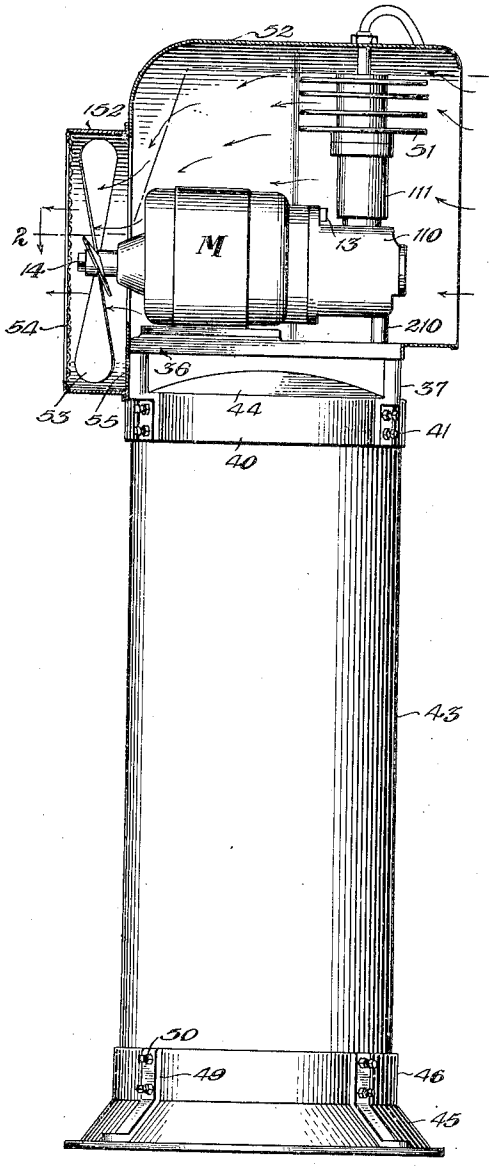


Fig. 7.

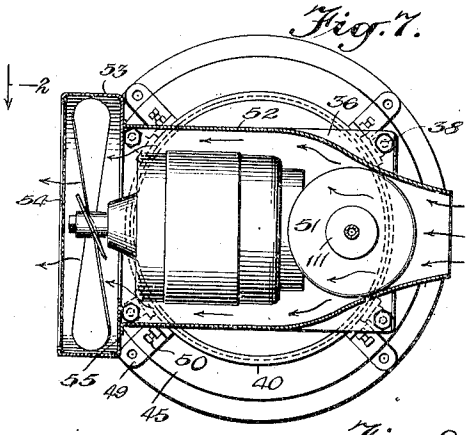


Fig. 8.

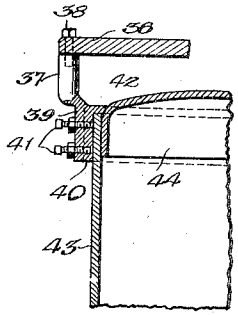
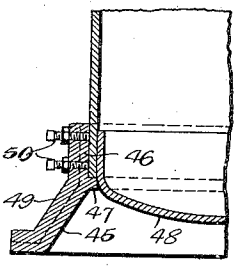


Fig. 9.



WITNESSES

INVENTOR

Gregory John Spohrer

BY

ATTORNEYS

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UNITED STATES PATENT OFFICE.

GREGORY JOHN SPOHRER, OF EAST ORANGE, NEW JERSEY.

ELECTRIC-MOTOR-DRIVEN COMPRESSOR.

Application filed June 30, 1923. Serial No. 648,727.

To all whom it may concern:

Be it known that I, GREGORY JOHN SPOHRER, a citizen of the United States of America, and a resident of East Orange, in the county of Essex and State of New Jersey, have invented a new and Improved Electric-Motor-Driven Compressor, of which the following is a description.

My invention relates to a high-speed compressor pump arranged to respond to a high-speed motor and is designed more especially for embodiment in garage compressors for storing air for tire inflation although the organism hereinafter described may obviously be used in compressing air for various purposes and gases other than air.

The present invention is especially designed for embodiment in a compressor constituting an improvement on an air compressing assemblage forming the subject matter of an application for patent filed by me in the United States Patent Office under date of June 28, 1921, Serial Number 480,952.

An object of the present invention is to provide novel means whereby to cause air to pass into the compression cylinder without contact with the oil in the mechanism casing of the compressor.

An important object also of the invention is to provide for utilizing a storage tank as the supporting column or pedestal for mounting the motor and compressor assemblage and more specifically to provide for mounting the motor and compressor assemblage so that the mass thereof will be within the projected lines of the tank looking toward making for stability.

The invention furthermore has for an important object to provide in connection with the motor and compressor assemblage a housing, and a cooler fan so positioned in the housing that an arrangement is provided whereby the cooling air will have the maximum efficiency.

The invention also has for an object to provide an assemblage of the indicated character reflecting practical considerations with respect to strength, simplicity and compactness and to promote facility in the manufacture, assemblage and adjustment of the parts.

The manner and means whereby the above and other objects are attained will clearly appear as the description proceeds.

Reference is to be had to the accompanying drawings forming a part of this specification, it being understood that the drawings are merely illustrative of an example of the invention.

Figure 1 is a view partly in side elevation and partly in longitudinal vertical section showing the motor and compressor assemblage;

Figure 2 is an enlarged vertical section of the upper end of the piston and its inlet valve;

Figure 3 is a plan view of the piston and its inlet valve;

Figure 4 is a front view of the balance crank attachment with an oil separating disk applied thereto;

Figure 5 is a fragmentary view of a peripheral portion of a second disk employed between the balance crank attachment and the electric motor bearing;

Figure 6 is a side elevation of a complete assemblage in accordance with the present invention, including the utilization of a vertical storage tank as the pedestal or column on which the base of the motor and compressor assemblage is mounted, said view showing a housing for the motor and compressor assemblage in longitudinal vertical section;

Figure 7 is a sectional plan view, the section being indicated by the line 2—2, Figure 6;

Figure 8 is a fragmentary view in vertical section given to show a detail of the means for mounting the motor base on the pedestal tank;

Figure 9 is a fragmentary view in vertical section showing the means whereby the pedestal tank is secured to the base ring involved in the utilization of the tank as a pedestal.

Referring to the illustrated example the numeral 10 indicates a casing which relates to the compressor pump and to which the compressor cylinder 11 is secured preferably by a threaded connection and a set screw whereby to eliminate clearance between the cylinder and piston. The casing 10 is shown with a lateral extension directly secured by bolts to the adjacent end of the motor M

which usually in practice is a high-speed electric motor, the arrangement serving to centralize the compressor on the end of the motor casing. As fully explained in my aforenamed application neither the casing 10 nor cylinder 11 has bearings to take the thrust of the piston and drive, the bearings of the motor M taking the thrusts and strains of the compressor, for which purpose the motor shaft 14 extends into casing 10 so that the adjacent bearing *m* of the motor lies within the lateral extension of casing 10. I have shown a balance crank attachment 15 secured by a set screw 115 to the crank 16 which receives one end of connecting rod 17 the opposite end of which is connected to a wrist pin 18 of piston head 19. Said piston head 19 has air admission ports 20 controlled by a valve 21 secured as by a screw 22.

The foregoing details do not form part of the present invention but form the subject matter of my mentioned previous application.

The air entrance is between the compressor casing 10 and the adjacent end of the casing of the motor M and in order to maintain the separation of the air and the oil in the casing 10 I provide a disk 23 fitting on shaft extension 14, there being peripheral indentations 24 of V-shape in said disk and the edge of the disk lying against an annular flange 25 in the casing 10. A second disk 26 is applied to the crank attachment 15 at the inner end of the crank pin 16.

The disk 23 permits air to pass through the indentations 24 and to the cylinder 11 while the disk 26 prevents the splashing of the oil toward the entering air passing along the disk 23 and the casing 10 at the flange 25. 27 indicates an oil lifting element in the plane of the crank pin 16 to move with the connecting rod 17. Any other suitable oiling device may be employed.

The piston head 28 is shown as secured in rabbets in the cylinder 11 and cap 29 and therefore held by the bolts 30 securing said cap in place on the cylinder. A discharge port 31 is formed centrally in cylinder head 28 and is covered by a disk valve 32 under the action of coil spring 33 so that compressed air can pass through valve 32 to the interior of the cap 29 from which it escapes to the outlet pipe 34. A water jacket 35 is shown in Figure 1 as provided on the cylinder 11 as a cooling means.

The base 36 supports the described motor and compressor assemblage and the mass of said assemblage is within or substantially within the vertically projected lines of the base, the purpose of which arrangement is to provide for the mounting of the motor assemblage on a compressed air storage tank as a column or pedestal and at the same time lend stability to the arrangement. The preferred embodiment of the invention is as shown in Figures 6 to 9, which involves an air cooling means for the pump and motor as will appear. The base 36 is seated upon upstanding brackets 37 to which the base is secured by tap bolts 38 or the like. The lower portions of the brackets 37 are offset laterally inward as at 39 and are brazed or otherwise made rigid with a cap ring 40 having a flange 41 directed laterally inward to rest on the upper edge of the body of the air tank 43 adjacent to the upper head 44 of said tank. Set screws 41 are passed through the brackets 37 and ring 40 to bear against the tank and tightly hold the ring 40 in position. The arrangement is such that the mass of the motor and pump assemblage lies completely or substantially within the vertically projected lines of the base 36 and tank 43 to insure stability.

To complete the conversion of the tank 43 into a supporting column or pedestal for the motor and pump assemblage I provide a base fitting for the tank in the form of a flaring ring 45 having integral therewith a cylindrical ring 46 extending about the lower end of the body of tank 43. Said flaring ring 45 at the base of the cylindrical ring 46 thereof has a flange 47 directed laterally inward on which the lower edge of tank 43 rests, said flange 47 being disposed adjacent the lower head 48 of the tank. Onto the ring 45 are brazed or otherwise fixedly attached reinforce members 49 through which members and ring 46 set screws 50 pass to bear against the sides of the tank and rigidly hold the base attachment in position.

In the preferred form of the invention as shown in Figures 5 to 9, for the purpose of air cooling the pump and motor, the cylinder 111 rises from the bottom extension 110 thereof and said extension is secured by bolts 13 to the motor M as described. The cylinder 111 has cooling disks or annular flanges 51 and a housing 52 covers the pump and the motor and is supported on the base 36. The extension 110 of the pump has a supporting leg 210 resting on the base 36. To cause a current of air to be passed through the housing 52, a fan 53 is provided which, it will be noted, is applied to the motor shaft 14 at the rear end or end opposite to that at which the pump is mounted. The housing 52 is convergent toward the front end and extends slightly beyond the pump cylinder 111, the sides of the housing lying close to the cooling flanges 51. Air is thus drawn into the housing 52 by the fan 53 past the pump cylinder 111 and its extension 110 between the cooling disks 51 and thence over the motor M and out through the rear end 152 of the housing 52, said extension constituting a guard for the fan 53. By disposing the fan with its axis in line with

the axis of the motor the air is most effectively drawn over the motor for cooling. The air, it will be noted, is first drawn past the pump and then over the motor, the arrangement making for the maximum efficiency in cooling to take care of the heat developed by the high speed attained in my pump and motor assemblage. The rear end of the housing extension 152 has a guard screen 54. Also, a vertical partition 55 is provided in the housing 52 at the inner end of the fan guard extension 152, said partition being so formed as to prevent air being wastefully drawn beneath the base 36 between the same and the tank 43, said partition causing the air to be drawn close to the motor.

I would state in conclusion that while the illustrated example constitutes a practical embodiment of my invention, I do not limit myself strictly to the exact details herein illustrated, since, manifestly, the same can be considerably varied without departure from the spirit of the invention as defined in the appended claims.

Having thus described my invention, I claim:

1. A compressor of the class described, comprising a piston and cylinder, a casing on said cylinder forming a container for oil and drive elements, said casing having means whereby to secure it to an electric motor so that said drive elements will be actuated by the shaft of the electric motor, said casing at one end thereof affording an inlet for air to said oil container, and means in said oil container and near the air inlet to said oil chamber and forming an air baffle within the container to maintain separated the oil passing to the cylinder through said oil container.

2. A compressor of the class described, comprising a cylinder and a piston, a connecting rod to drive said piston, said cylinder having a casing in communication therewith adapted to be secured to an electric motor, drive means in said casing for said connecting rod, and a disk associated with said drive means, said compressor casing having an inlet for air at one side of said disk and the disk serving to prevent splashing of oil into the air passing through said casing to the cylinder.

3. A compressor of the class described, having a casing, an electric motor to which said casing is secured, the shaft of said electric motor extending into said casing and the latter affording an inlet for air, a disk about said shaft and affording a passage at its periphery for the air, a drive means on said shaft to actuate the piston, and a second disk turning with said drive means and adapted to keep oil from splashing to the entering air.

4. A compressor of the class described, comprising a cylinder, and a piston, said cylinder having a casing in communication therewith and affording an inlet for air, and drive means in said casing for said piston; together with approximately parallel disks coaxial with the drive means and adapted to maintain oil and air separated.

5. A compressor assemblage including a motor, a compressor pump comprising a piston and a cylinder, said piston having driven connection with said motor, a base supporting said motor and pump, an air tank disposed vertically and constituting a pedestal, and a band clamped to said tank and mounting said base.

6. A compressor assemblage including a motor, a compressor pump rigid with the motor casing, a base supporting the pump and the motor, and a clamp mounting said base and adapted to embrace and engage an air tank.

7. A compressor assemblage including a motor, a compressor pump rigid with the motor casing, a base supporting the pump and the motor, a clamp mounting said base, and a tank embraced and engaged by said clamp; together with a base ring having means clamping it to the lower end of said tank.

8. A compressor assemblage comprising an air tank, a brace having clamp means holding it to the tank, a clamp band mounted on the tank at the upper end, a base mounted on said clamp band, a motor, and a compressor pump rigid with the motor casing, said motor and pump supported on said second-mentioned base.

9. A compressor assemblage comprising an air tank, a base having clamp means holding it to the tank, a clamp band mounted on the tank at the upper end, a base mounted on said clamp band, a motor, and a compressor pump rigid with the motor casing, said motor and pump supported on said second-mentioned base and substantially within the projected lines of said second-mentioned base.

10. A compressor assemblage including a motor, a pump associated with and driven by the motor, a base supporting the motor and pump, and a clamp ring adapted to be secured to a tank and mounting said base, said clamp ring having clamp means to engage the tank and having a flange directed laterally inward to rest upon the tank at the top.

11. A compressor assemblage including a motor, a pump associated with and driven by the motor, a base supporting the motor and pump, an air tank, and a clamp ring mounting said base, said clamp ring having clamp means engaging the tank and having a flange directed laterally inward and resting upon the tank at the top; together with a base having a ring embracing the tank at

the bottom, clamp means on the second base engaging the tank and a flange on the base projecting laterally inward and extending beneath the bottom of the tank.

12. A compressor assemblage comprising a motor, a pump associated with and driven by the motor, a base supporting said motor and pump, an air tank, a clamp band upon which said base is mounted, said band being secured to said air tank at the upper end, and a base ring separate from the first-mentioned ring and having means securing it to said air tank at the bottom.

GREGORY JOHN SPOHRER.