May 25, 1943. B. S. AIKMAN 2,319,911

AIR COMPRESSOR

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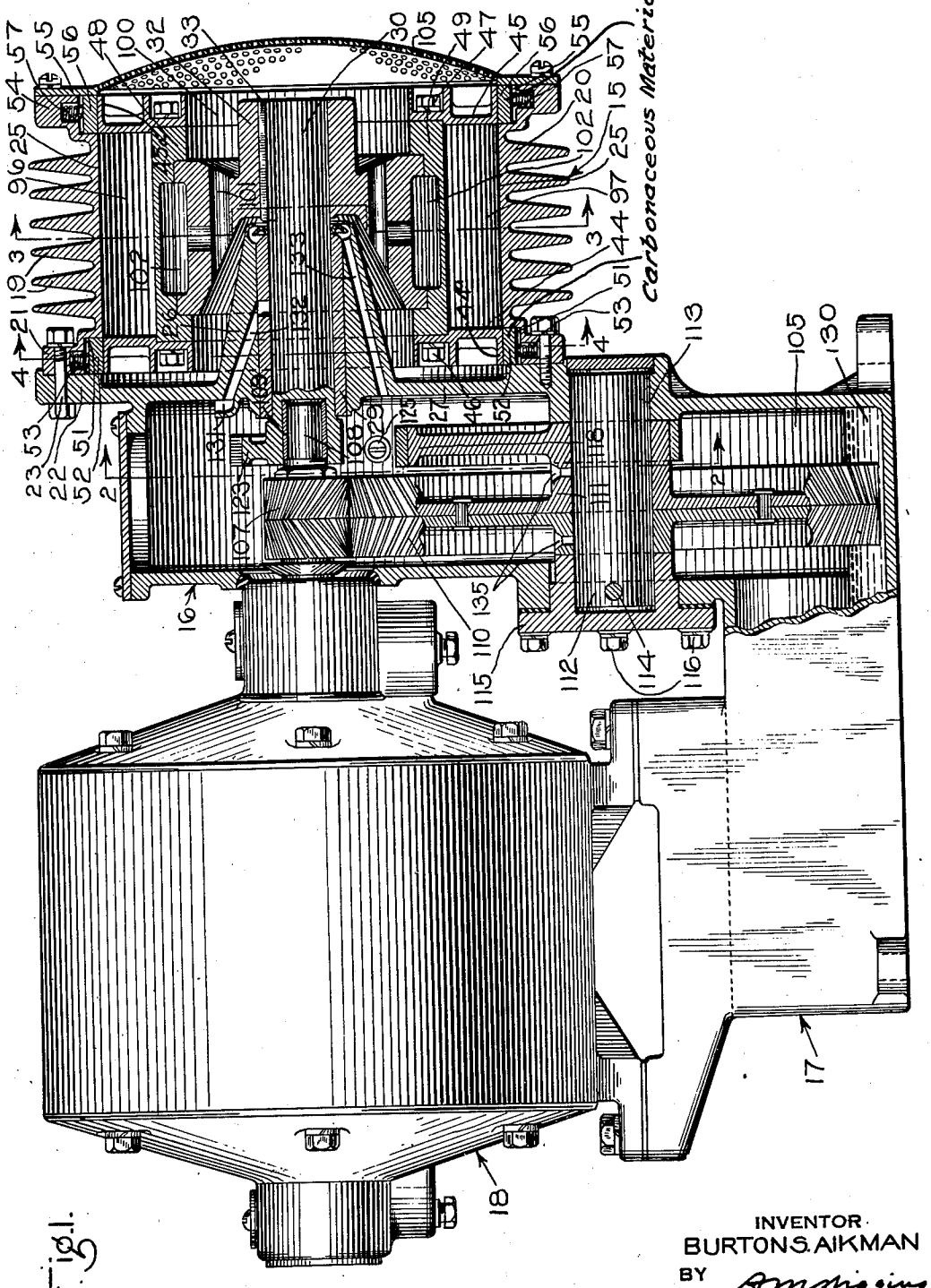


Fig. 1.

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Fig. 2.

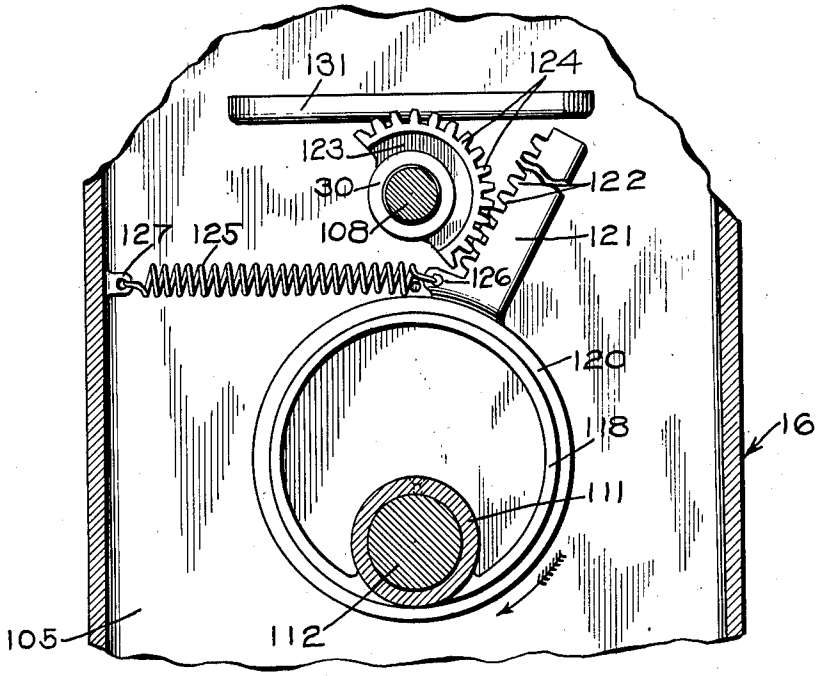
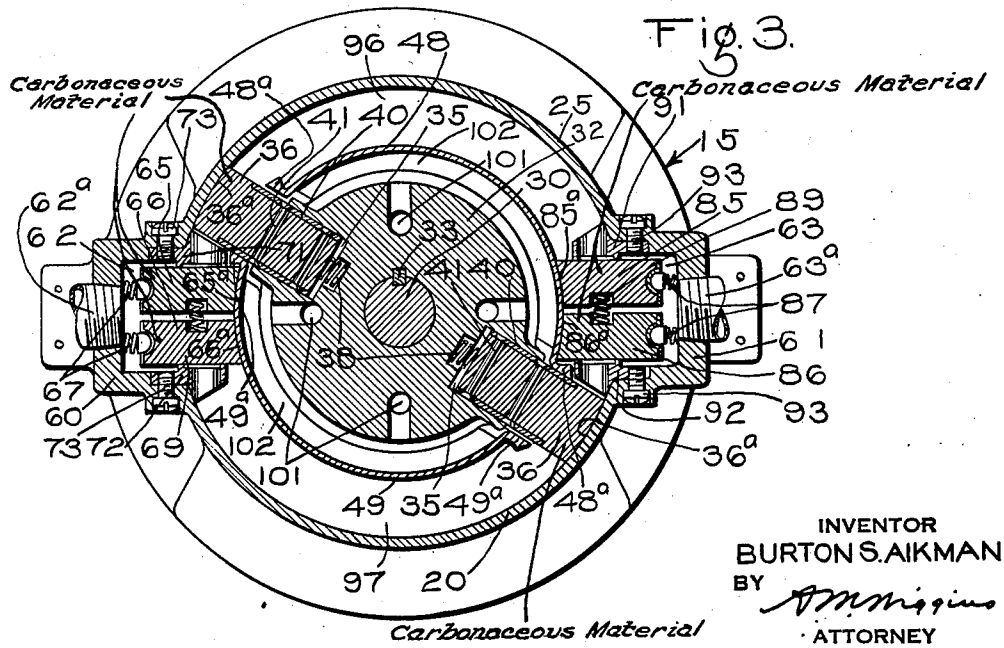


Fig. 3.



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Fig. 4.

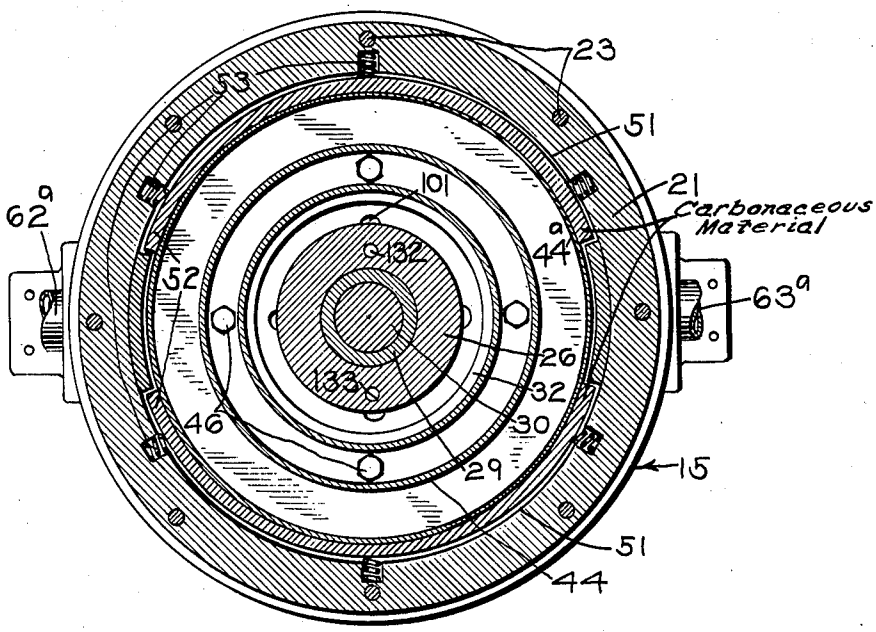
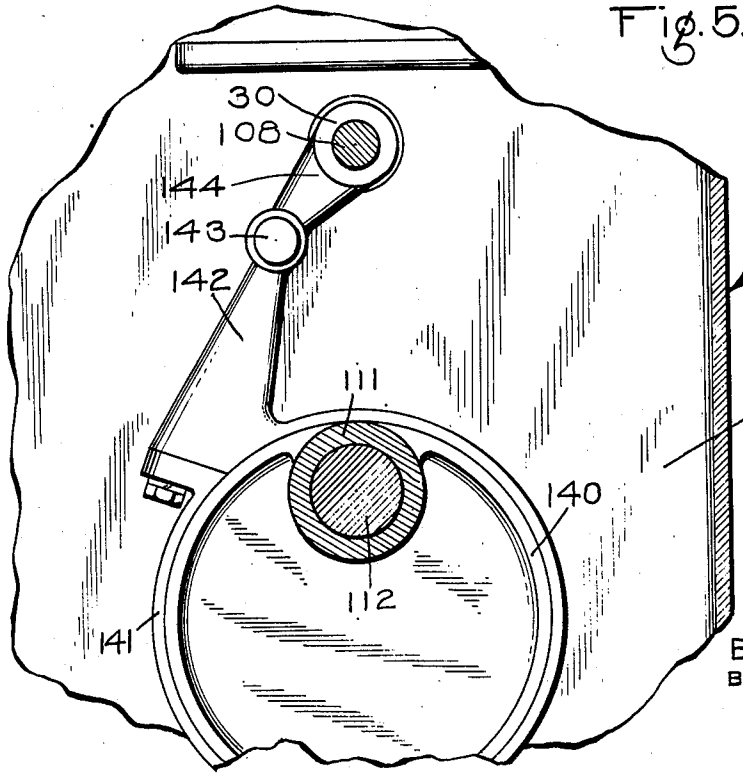


Fig. 5.



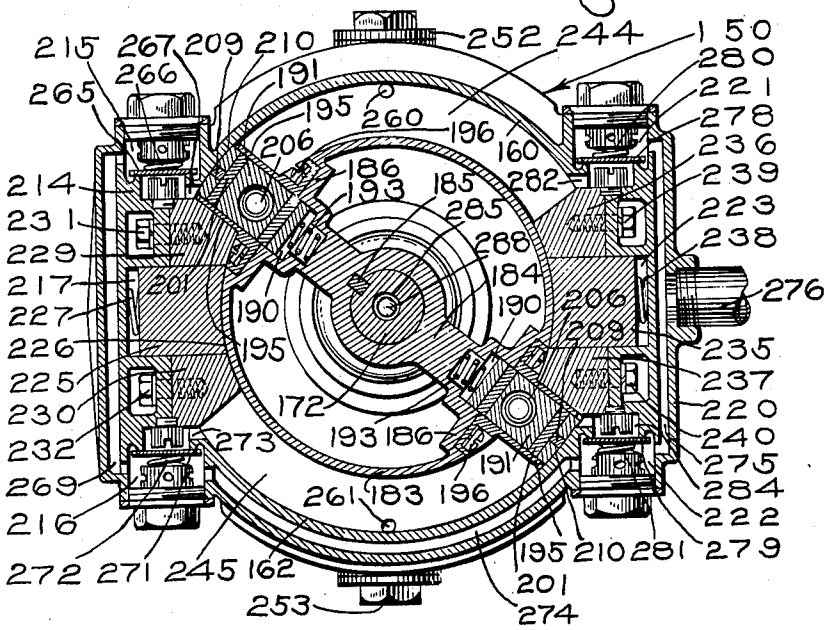
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AIR COMPRESSOR

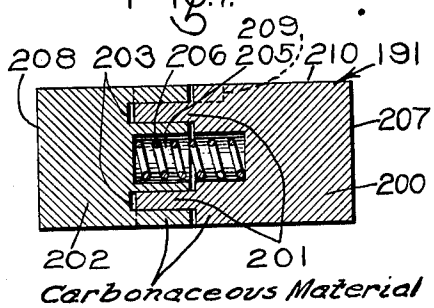
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Fig. 6.



Note: Elements 191, 225, 229, 230, 235, 236 & 237 Made Of Carbonaceous Material

Fig. 7.



Carbonaceous Material

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Fig. 8.

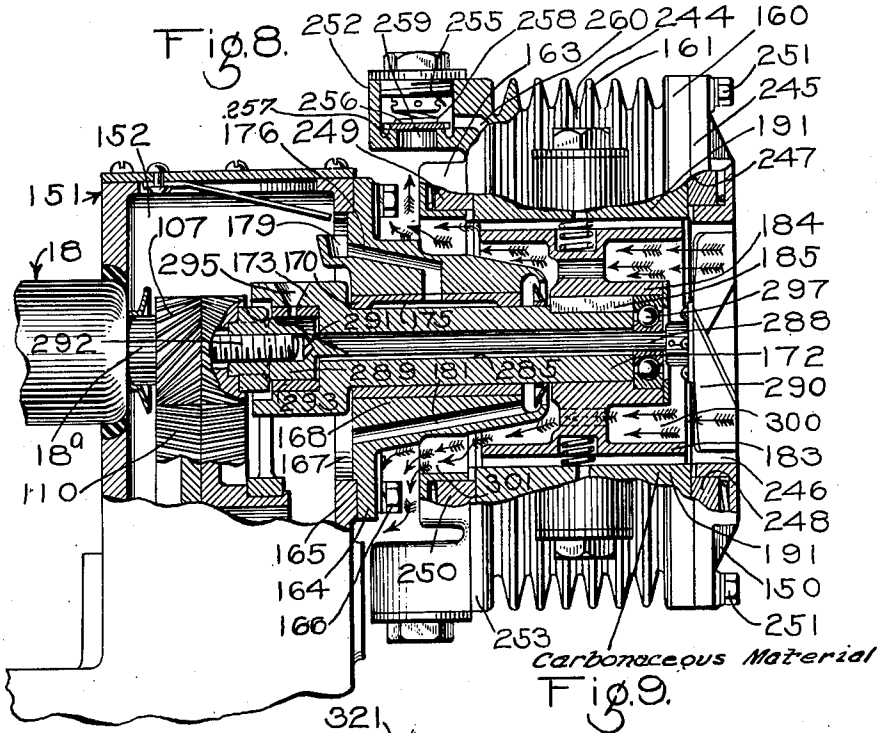
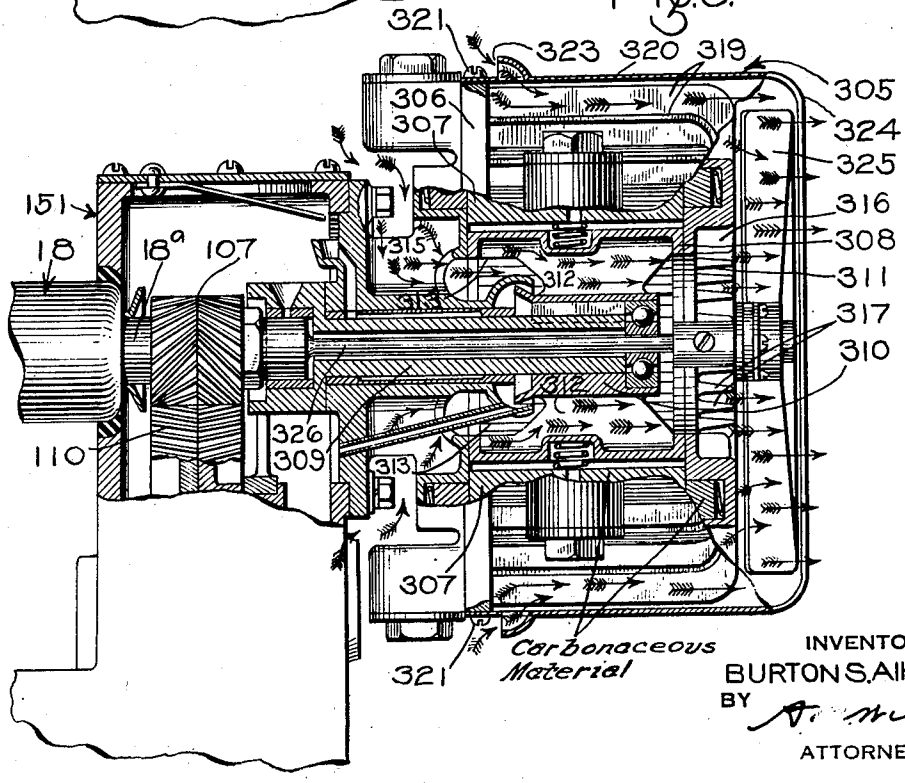


Fig. 9.



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Fig. 10.

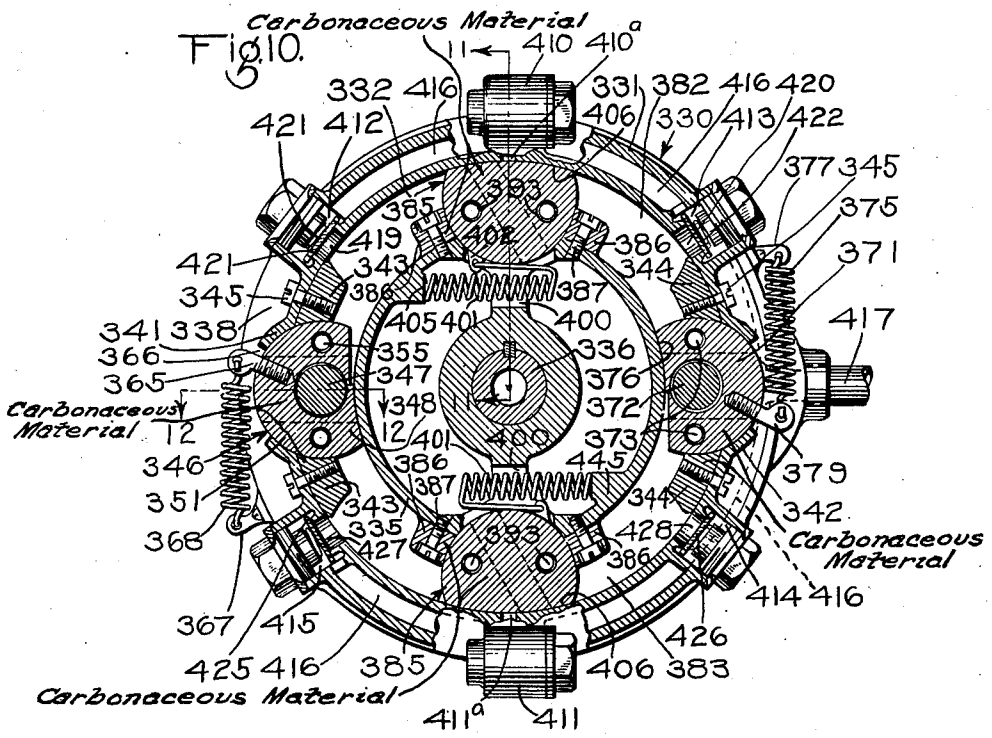


Fig. 11.

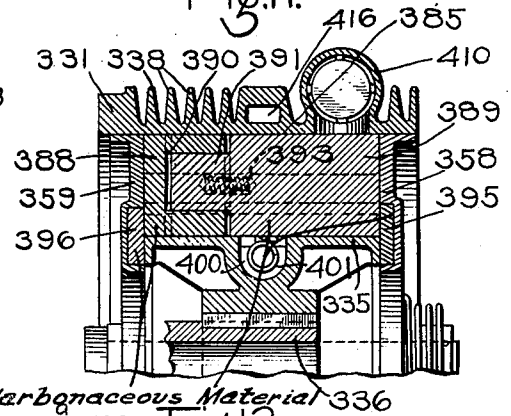


Fig. 12.

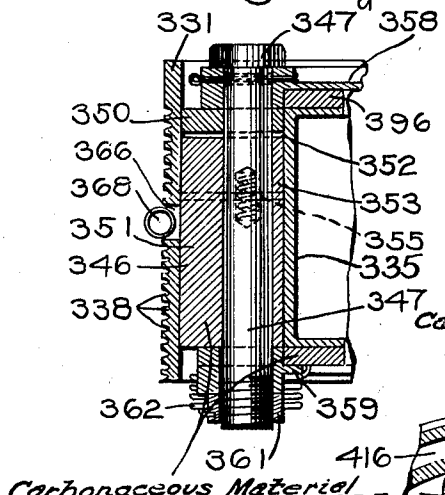
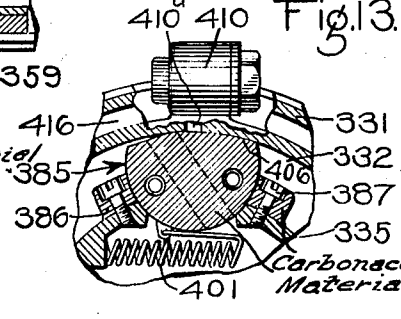


Fig. 13.



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UNITED STATES PATENT OFFICE

2,319,911

AIR COMPRESSOR

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Application January 28, 1939, Serial No. 253,378

7 Claims. (Cl. 230—159)

This invention relates to fluid compressors, and more particularly to a compressor having oscillating pistons or vanes for compressing air or other fluid.

In designing a compressor of the conventional reciprocating piston type, it has been found difficult to produce a machine which occupies only a relatively small space and which at the same time is adapted for the high speed operation necessary to insure maximum capacity, because of problems including those of providing for maximum volumetric efficiency and proper cooling of the compacted parts of such a compressor, as well as structural problems such as those of providing dependable lubricating means and of balancing or minimizing load on the bearings and other operating elements.

One object of the present invention is to provide an efficient high speed compressor of small dimensions, the novel construction and arrangement of the parts of which are such as to obviate the above difficulties.

Another object of the invention is to provide a high speed compressor of sturdy and inexpensive design, comprising a casing having arcuate compression chambers within which balanced fluid compressing pistons or vanes are operatively mounted, and means including a central shaft for oscillating the vanes for effecting a continuous flow of fluid under pressure by way of suitable valves associated with each chamber.

It is a further object of the invention to provide a compressor of the above type adapted to be provided with fluid compressing vanes and sealing elements formed of a self-lubricating substance, preferably a solid carbonaceous material, so that fluid lubricant is not required in the portion of the compressor through which the air or other fluid is passed during the compressing operation.

A still further object is to provide an efficient air cooled compressor in which the various members and operating parts are so constructed and arranged as to occupy relatively small space.

Other objects and advantages of the invention will appear in the following more detailed description thereof, taken in connection with the accompanying drawings:

Fig. 1 is an elevational view, mainly in section, of one form of motor driven fluid compressor constructed in accordance with the invention;

Fig. 2 is a fragmentary sectional view taken along the line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken substantially along the line 3—3 of Fig. 1;

Fig. 4 is a sectional view taken along the line 4—4 of Fig. 1;

Fig. 5 is a fragmentary plan view of another form of oscillating drive mechanism for a compressor embodying my invention;

Fig. 6 is a sectional plan view, similar to that in Fig. 3, but showing a different embodiment of the invention;

Fig. 7 is a sectional plan view of one of the fluid compressing vane devices shown in Fig. 6;

Fig. 8 is an elevational view, mainly in section, of the compressor shown in Fig. 6;

Fig. 9 is a fragmentary elevational view, mainly in section, illustrating another method of cooling a compressor embodying the invention;

Fig. 10 is a sectional view of the compressing portion of a compressor constructed in accordance with still another form of the invention;

Fig. 11 is a sectional view taken along the line 11—11 of Fig. 10;

Fig. 12 is a sectional view taken along the line 12—12 of Fig. 10; and

Fig. 13 is a fragmentary sectional view showing one of the fluid compressing vanes of the compressor shown in Fig. 10 automatically adjusted for wear.

Description of embodiment shown in Figs. 1 to 5

As shown in Fig. 1 of the drawings, the invention may be embodied in an equipment comprising an oscillating compressor 15, a gear housing 16 adapted to carry the compressor, a base portion 17 supporting the gear housing, and a driving motor 18 mounted on the base portion.

According to my invention, the compressor 15 is of novel construction and has a mode of operation entirely unlike that of the conventional compressor, in that it embodies, among other features, a pair of oppositely disposed self-lubricating vanes which are adapted to be oscillated by means of a single shaft for compressing fluid within separate arcuate compression chambers. The compressor 15 comprises a cylindrical casing 20 provided with exterior annular cooling fins 19 and having formed at the inner end thereof an annular flange portion 21, which is adapted for sealing engagement with a complementary flange portion 22 formed on the gear housing 16 and is secured thereto by means of bolts 23. The cylindrical casing 20 is preferably disposed with its axis in a horizontal position, and is provided with a substantially circular interior bore 25 into which projects a concentrically disposed conical

bearing portion 26 carried by the gear housing 16 and extending from a web portion 27 formed integrally within the flange portion 22. A cylindrical bushing 29 is fitted within the bearing portion 26 and has journaled therein a compressor shaft 30, an outer portion of which extends coaxially within the bore 25 of the compressor casing. The outer end of the shaft 30 carries a substantially circular drum member 32, which has a longitudinal bore for receiving the shaft 30 and is secured thereto by means of a key 33.

The drum member 32 has two longitudinal channels 35 formed therein diametrically opposite each other and equally spaced from the shaft 30, as is best shown in Fig. 3 of the drawings. Slidably mounted in each of the channels is one of a pair of fluid compressing abutments or vane members 36, both of which extend outwardly of the drum member 32 and have suitably curved bearing surfaces 36a disposed in sliding engagement with the wall of the bore 25. One or more springs 38 are interposed between the inner end of each vane member 36 and the wall of the channel 35 for urging the vane member outwardly.

Each of the vane members 36 comprises a substantially rectangular block preferably made of self-lubricating non-metallic material, such as carbon or a suitable carbonaceous composition, and is provided with reenforcing plates 40 secured at opposite sides thereof by means of transverse rivets 41. It should be undertsood that the carbonaceous material of which the vane members 36 may be made is of such a texture as will receive a smooth or polished surface such as the bearing surfaces 36a, and is adapted to have low friction characteristics such as will permit operation of the vanes 36 in sliding contact with the interior wall at the casing 20 without requiring the supply of fluid lubricant.

The self-lubricating vane members 36 are provided with terminal sealing faces and are adapted to be interposed between two annular end plate elements 44 and 45, which, as shown in Fig. 1, are disposed concentrically of the shaft 30 and are respectively secured by means of bolts 46 and 47 to a pair of matched semicircular valve members 48 and 49 that are spaced on opposite sides of and in sliding engagement with the drum member 32. Within the flange portion 21 of the casing 20 are formed a pair of annular recesses 51 adapted to receive two arcuate sealing members 52, which are preferably formed of a self-lubricating carbonaceous material similar to that of the vane member 36. The sealing members 52 are disposed concentrically of the shaft 30, and are yieldingly supported in sliding engagement with an annular flange portion 44a of the sealing plate element 44 by means of springs 53 which are mounted in suitable seats formed in the casing.

Similarly, an annular flange portion 54 formed on the outer end of the casing 20 is provided with recesses 55 containing arcuate sealing members 56, which like the sealing members 52 are disposed concentrically of the shaft 30 and are urged under the pressure of a plurality of springs 57 into sealing engagement with the annular flange portion 45a of the sealing plate element 45 for yieldingly supporting said element, as shown in Fig. 4 of the drawings.

As is best shown in Fig. 3 of the drawings, the vane members 36 are interposed between the semi-circular valve members 48 and 49, which valve members are provided at each end with flat seat portions 48a and 49a, respectively, which are aligned for sealing engagement with the adjacent areas of the reenforcing plates 40 of said vane members. It will be observed that the drum member 32 and vane members 36 carried thereby are adapted to have a lost motion or relative movement with respect to the associated valve members 48 and 49, and that the seat portions 48a and 49a of the latter are so spaced on opposite sides of each corresponding vane member as to cause one or the other of said seat portions to be held in seating engagement with the vane member while the other seating portion is maintained out of engagement therewith. As hereinafter more fully explained, the valve members 48 and 49 are adapted to control the inlet supply of air or fluid to the compressor.

Formed on diametrically opposite sides of the casing 20 are two valve box portions 60 and 61, which as shown in Fig. 3 enclose discharge valve chambers 62 and 63, respectively, each of which is adapted to be connected by suitable conduits such as 62a and 63a to a receiving reservoir, not shown.

Within the valve chamber 62 are mounted two substantially rectangular discharge valve blocks or members 65 and 66, which are disposed longitudinally of the compressor casing 20 and have suitably curved sealing surfaces 65a and 66a adapted to be held in sliding engagement with the outer surface of the arcuate valve member 49 under the pressure of coil springs 67 which are interposed between the respective members 65 and 66 and the wall of the chamber 62. One or more coil springs 69 may be interposed between the valve members 65 and 66 for urging them apart and into seating engagement with longitudinally disposed valve seat members 71 and 72, respectively, which seat members may be secured to the box portion 60 by any suitable means such as screws 73.

Similarly, the discharge chamber 63 has mounted therein a pair of discharge valve members 85 and 86, which, like the members 65 and 66 are preferably formed of self-lubricating carbonaceous material and have longitudinal sealing surfaces 85a and 86a bearing against the outer surface of the arcuate valve member 48 under the force of coil springs 87. One or more coil springs 89 are interposed between the valve members 85 and 86 for urging them into seating engagement with seat members 91 and 92, respectively, which are secured to the casing by means of screws 93.

It will be understood that the terminal end surfaces of the respective discharge valve members 65, 66, 85 and 86 are suitably formed for sliding and sealing engagement with the inner surfaces of the sealing plate elements 44 and 45 shown in Fig. 1. It will also be observed that the two pairs of discharge valve members just referred to constitute terminal walls for two arcuate compression chambers indicated generally by the characters 96 and 97, each of which compression chambers is adapted to be traversed by one of the fluid compressing vane members 36 during operation of the compressor as hereinafter explained.

As shown in Fig. 1 of the drawings, air or other fluid to be compressed is admitted to the compression chamber by way of communications including an opening 100 formed in the annular member 45, a plurality of passages 101 formed in the drum member 32, and arcuate passageways

102 formed intermediate the drum member and the adjacent valve members 48 and 49. Communication from the passageways 102 to the two compression chambers 96 and 97 is controlled in each case by the corresponding inlet valve member 48 or 49. A perforated metal or wire mesh screen 105 is mounted outwardly of the open end of the passage 100 for preventing access of foreign matter to the compressor.

Referring to Figs. 1 and 2, within the gear housing 16 is provided an oscillating drive mechanism operative to actuate the compressor shaft 30 and associated elements with an alternately reversing rotary motion, which mechanism is contained within a chamber 105 formed in the housing and entirely separated from operating parts of the compressor 15 by the web portion 27. Rotatively mounted in the upper part of the chamber 105 is a pinion 107, which is keyed or otherwise connected to the drive shaft of the motor device 18, and has a supporting bearing portion 108 journaled in a bushing 109 carried by an end of a compressor shaft 30 that extends into the chamber 105. The pinion 107 is provided with herringbone teeth adapted to mesh with similarly formed teeth of a gear 110, which has a central sleeve portion 111 journaled on a horizontally disposed stud 112 having one end mounted in a bore 113 formed in the housing 16 and the other end secured by means of a pin 114 in a cap member 115, which is secured to the housing by bolts 116. Formed integrally with or suitably secured to the cylindrical portion 111 of the gear is an eccentric disc 118, which is disposed beneath the end of the compressor shaft 30 extending into the chamber 105.

As is best shown in Fig. 2 of the drawings, a strap element 120 is journaled on the eccentric disc 118, which strap element has formed thereon an upwardly extending rack portion 121 having a plurality of teeth 122. A semi-circular pinion 123 is formed on or suitably secured to the end of the compressor shaft 30 within the chamber 105 and is provided with teeth 124 which are adapted to mesh with the teeth 122 of the rack portion 121 under the force of a tension spring 125, which is connected to a lug 126 formed on the rack portion and to a lug 127 provided on the wall of the housing 16.

It will be understood that the rack portion 121 and pinion 123 associated therewith are so constructed and arranged that upon each revolution of the eccentric disc 118, the strap 120 and rack portion 121 thereof are actuated to effect rotation of the pinion 123 and the compressor shaft 30 in one direction through an angle equal to that traversed by the fluid compressing vanes 36 as shown in Fig. 3, during one compression stroke thereof as hereinafter explained, followed by returned rotation of said compressor shaft 30 in the reverse direction and through the same angle.

In order to provide splash lubrication for the oscillating drive mechanism just described, the chamber 105 within the housing 16 is adapted to contain a supply of lubricant 130 within the path of the teeth of the gear 110, which is thus adapted in operation to carry lubricant upwardly and to propel it against the upper walls of the chamber. A trough 131 is formed on the web portion 27 for receiving a portion of the lubricant thrown from the gear 110, from which trough the lubricant is permitted to flow through a passage 132 provided in the conical portion 26 and bushing 29 to the bearing surface of the compressor shaft 30. In order to prevent lubricant from leaking past the shaft 30 into other portions of the compressor, a return flow passage 133 is formed in the lower portion of the conical portion 26, which passage communicates with the chamber 105 as shown in Fig. 1. Oil ducts 135 are formed in the cylindrical portion 111 for admitting lubricant to the bearing surface of stud 112.

Operation of embodiment shown in Fig. 1

When supplied with electric current the driving motor 18 is operated in the usual manner to rotate the pinion 107, which in turn effects rotation of the gear 110 and the eccentric disc 118 connected thereto. As hereinbefore explained the rotation of the eccentric disc 118 is effective through the medium of the strap 120 and rack portion 121 to effect alternately reversing rotation of the pinion 123 and compressor shaft 30 through a predetermined angle.

Referring to Fig. 3 and assuming that the vane members 36 and associated elements are initially positioned as therein shown, it will be observed that the valve seat portion 48*a* within the chamber 96 and the valve seat portion 49*a* within the chamber 97 are both positioned out of engagement with the corresponding plates 40 of the vane members, so that air is free to flow from the atmosphere by way of the passage 100 (see Fig. 1) and passages 101 and 102 to the compression chambers 96 and 97. At the same time, the discharge valve members 65, 66, 85 and 86 are held in their respective seated positions.

If the compressor shaft 30 and the drum member 32 are now rotated in a clockwise direction, as viewed in Fig. 3, the vane members 36 are initially moved in the same direction toward the valve seat portion 48*a* within chamber 96 and valve seat portion 49*a* within chamber 97, respectively, it being understood that the valve members 48 and 49 together with the sealing plate members 44 and 45 shown in Fig. 1 are held stationary due to friction and inertia during this first period of the compression stroke. It will also be noted that in thus moving, the vane member 36 within the chamber 96 is carried away from the valve seat portion 49*a*, while similarly the vane member 36 in chamber 97 is moved out of engagement with the valve seat portion 48*a*.

As the leading faces of the vane members 36 are thus brought against the adjacent valve seat portions, and the members are further rotated in a clockwise direction, the valve members 48 and 49 and the sealing plate members 44 and 45 are carried in the same direction, while fluid is compressed within the portions of the compression chambers 96 and 97 at the respective leading sides of the vane members.

Fluid thus compressed in the compression chamber 96 at the right of the vane member 36, as viewed in Fig. 3, acts on the exposed surface of the discharge valve member 85 and forces the valve member downwardly and away from the valve seat member 91 against the force of the spring 89, whereupon fluid under pressure is discharged from the compression chamber 96 to the valve chamber 63 and thence through the conduit 63*a* to the usual receiving reservoir. At the same time, air or fluid to be compressed is drawn into the portion of the chamber 96 to the left of the vane member 36, i. e., on the trailing side thereof, by way of the inlet passages 101 and 102, and past the unseated seat portion 49*a* of the valve element 49.

In like manner fluid under pressure in the

compression chamber 97 at the leading side of the lower vane member 36 is effective to force the discharge valve member 66 away from the seat 72 for permitting discharge of fluid under pressure from the chamber 97 through the valve chamber 62 and conduit 62a to the reservoir, while fluid is admitted to the portion of the chamber 97 at the trailing side of the vane member 36 by way of the passages 101 and 102 and past the unseated portion 48a of the inlet valve 48.

When the vane members 36 have thus been rotated through the angle limiting the extent of the stroke in one direction, the compressor shaft 30 and drum member 32 are brought to a stop and rotation thereof in a counterclockwise direction is immediately begun by operation of the oscillating drive mechanism as hereinbefore explained. As the compression vane members 36 are thus carried in a counterclockwise direction, fluid is again compressed within the chambers 96 and 97 at the leading sides of the vane members, it being understood of course that initial counterclockwise movement thereof again effects seating of the valve seat portion 49a within chamber 96 and of the valve seat portion 48a in chamber 97. Fluid compressed within the chamber 96 is this time discharged therefrom past the discharge valve member 65 which has meanwhile been moved away from the valve seat member 71, while fluid under pressure is discharged from the chamber 97 past the unseated discharge valve member 86 and thence to the receiving reservoir.

It will thus be apparent that, as the above explained cycle of oscillation of the compressing vanes 36 is repeated by continued operation of the associated driving motor and gear mechanism the compressor 15 is operated to effect a substantially constant supply of fluid under pressure by way of the conduits 62a and 63a to the receiving reservoir. It will further be noted that the compressor driving mechanism is operative to oscillate the compressing vanes through relatively long strokes, so that the respective vane members may be provided with smaller compression areas than would otherwise be the case in providing for the required displacement, thereby minimizing load on the compressor driving mechanism.

In Fig. 5 of the drawings there is disclosed a different form of the oscillating drive mechanism which may be substituted for that shown in Fig. 2 as a means for converting unidirectional rotary motor of the gear and associated cylindrical portion 111 into oscillating motion or alternately reversing rotation of the compressor shaft 30. As shown in Fig. 5, the mechanism includes an eccentric disc 140 which may be secured to or formed integrally with the portion 111 of the gear, and a strap member 141 operatively fitted on the eccentric disc and having an arm portion 142, the upper end of which is pivotally connected by means of a pin 143 to the end of a crank 144 that is keyed or otherwise secured to the compressor shaft 30.

In operation, assuming that the eccentric disc 140 is rotated in a clockwise direction about the stud 112 in the manner hereinabove explained, the strap member 141 and arm portion 142 thereof will be reciprocated for operating the pin 143 and crank 144 to oscillate the compressor shaft 30 through an angle determined by the required extent of movement of the fluid compressing vanes as already explained.

Description in embodiment shown in Figs. 6 to 8

A compressor embodying my invention in a different form is illustrated in Figs. 6 to 8, inclusive, which compressor, although having substantially the same mode of operation as that already described, is provided with certain distinguishing features of construction as hereinafter explained. The fluid compressing equipment shown in Figs. 6 and 8 comprises a compressor 150 adapted to be mounted on a gear housing 151 which is adapted for association with the driving motor 18 and has a chamber 152 within which is mounted an oscillating drive mechanism that may be similar to either that shown in Fig. 2 or the alternative form shown in Fig. 5 of the drawings.

The compressor 150 comprises a cylindrical casing 160 having a plurality of exterior heat radiating fins 161 and provided with an interior bore 162, as shown in Fig. 6. The casing 160 is secured by suitable means, not shown, to a casing section 163 having a flange portion 164 which is secured to a complementary flange portion 165 of the housing 151 by means of bolts 166. The flange portion 165 of the housing is formed around an opening 167, which is adapted to be closed by a centrally disposed conical portion 168 formed on the casing section 163 and extending partly into the bore within the casing 160, as best shown in Fig. 8.

The hollow conical portion 168 is fitted with a longitudinally disposed bushing 170 in which is journaled a compressor shaft 172 having one end thereof disposed concentrically within the bore of the casing 160 and carrying at the inner end an enlarged portion 173, which is disposed within the chamber 152 of the gear housing 151. It will be noted that the bushing 170 is provided with an oil groove 175 communicating by way of a passage 176 formed in the casing section 163 with a trough 179 projecting into the chamber 152, which trough is adapted to be supplied with oil propelled to the upper part of the chamber 152 during operation of the gear mechanism as already explained. A return flow passage 181 is also formed in the conical portion 168 for providing communication through which excess oil may flow from the bearing of the compressor shaft 172 to the chamber 152.

Concentrically disposed within the bore 162 of the compressor casing 160 is a hollow drum member 183, which has a hub portion 184 provided with a longitudinal bore and fitted on the compressor shaft 172. The hub portion 184 may be secured to the shaft 172 by any suitable means such as a key 185. Two diametrically opposite socket portions 186 are formed on the drum member 183, each of which is provided with a longitudinal recess 190 adapted to receive one of a pair of self-lubricating vane devices 191, as shown in Fig. 6. The outer portions of the vane devices 191 are adapted to extend into sliding engagement with the wall of the bore 162 under the force of springs 193, each of which is interposed between the associated vane member and the end wall of the recess 190. Disposed laterally of each vane member 191 are two guide plates 195 which are secured by means of screws 196 to the adjacent socket portion 186 of the drum member for preventing misalignment of the vane devices.

Referring to Fig. 7, each of the vane devices 191 comprises a section 200 having a pair of tongues 201 extending longitudinally therefrom and a section 202 having spaced grooves 203 into

which the tongues 201 are adapted to be fitted, so that the sections 200 and 202 when assembled are relatively movable toward and away from each other. Mounted in a cavity 205 formed centrally within the sections 200 and 202 is a coil spring 206 which is adapted to urge the sections outwardly for insuring sealing engagement of the end surfaces 207 and 208 of the respective sections with end walls provided for closing the bore 162 in the compressor casing as hereinafter more fully explained. A rectangular sealing piece 209 may be inserted in a suitable groove formed in the outer sealing surface 210 of the assembled vane device for preventing leakage of fluid under pressure between said surface and the walls of the bore 162. Referring to Fig. 6, it will be noted that leakage of fluid past the tongue 201 of the vane devices 191 is prevented by reason of the overlapping end portions of the respective guide plates 195.

It should be understood that the sections 200 and 202 of each of the vane devices 191 are adapted to be formed of the same self-lubricating carbonaceous material as that of which the vane members 36 of the embodiment shown in Fig. 3 may be made, so that supply of oil or other lubricant to the compressor 150 will not be necessary.

Formed laterally on the casing 160 of the compressor are a side portion 214 having an upper valve chamber 215, a lower valve chamber 216 and a central guide groove 217, and a similar side portion 220 disposed opposite the portion 214 and having formed therein upper and lower valve chambers 221 and 222 and a central guide groove 223, which is disposed diametrically opposite the groove 217 with respect to the shaft 172 of the compressor. A sealing block 225 is slidably mounted in the groove 217 and has a sealing surface 226 adapted to be held in sliding engagement with the drum member 183 under the pressure of a coil spring 227 which is interposed between the block member and the wall of the groove 217. The block 225 is further supported and guided by a pair of guide members 229 and 230, which are mounted in the side portion 214 above and below the block by suitable means such as bolts 231 and 232, respectively. The sealing block 225 and both guide members 229 and 230 are preferably formed of self-lubricating carbonaceous material as already described.

Similarly, a sealing block 235 is slidably mounted within the guide groove 223 between a pair of guide members 236 and 237, and is urged into sliding engagement with the surface of the drum member 183 under the pressure of a coil spring 238. The guide members 236 and 237 may be secured in place by suitable means such as bolts 239 and 240.

It will thus be apparent that the space between the wall of the bore 162 in the casing 160 of the compressor and the movable drum member 183 is divided by the oppositely disposed sealing blocks 225 and 235 into two compression chambers indicated generally at 244 and 245, and that the respective vane devices 191 are each disposed within one of the cimpression chambers for compressing fluid as hereinafter explained.

As shown in Fig. 8 of the drawings, a cover plate member 245 is secured to the outer end of the casing 160 by means of bolts 251, and is provided with a central opening 246 above and below which are formed suitable recesses containing an arcuate sealing member 247 and a similar member 248, respectively, both of which may be made of the carbonaceous material hereinbefore described. The sealing members 247 and 248 are not shown in detail in the drawings, but it will be readily understood that each of said members is arranged concentrically of the compressor shaft 172 and is adapted to prevent leakage of fluid under pressure past the adjacent end surface of the corresponding vane device 191. Similar arcuate sealing members 249 and 250 are mounted in recesses formed in the casing section 163 and are maintained in sliding engagement with the opposite end faces of the respective vane devices 191.

Inlet valve portions 252 and 253 are formed on the casing section 163 and are adapted to contain similar inlet valve mechanisms for controlling the admission of air or other fluid to the respective compression chambers. As shown in Fig. 8 of the drawings, the inlet valve portion 252 has formed therein a valve chamber 255 containing a valve member 256 which is normally urged into seating engagement with a seat 257 under the force of a coil spring 258 and is adapted to control flow of fluid by way of an inlet opening 259 to the compression chamber 244. The valve mechanism within the lower valve portion 253 is substantially the same as that just described, and is accordingly not shown in detail.

As is indicated in Fig. 6 of the drawings, the inlet valve portions 252 and 253 are disposed substantially along a vertical center line of the compressor casing 160, and it will be understood that the valve mechanisms therein are adapted to control communication with the compression chambers 244 and 245 by way of suitable ports 260 and 261 opening into the respective chambers midway of the ends thereof. Each of the ports 260 and 261 is thus adapted to be uncovered by the corresponding vane device 191 as it passes the midpoint of its stroke. With the inlet ports 260 and 261 thus communicating with the respective chambers 244 and 245 mid-way of the ends thereof, it will be apparent that the inlet valve mechanisms will be operative to control admission of fluid to the compression chambers upon each compression stroke of the vane devices 191 during movement thereof in either direction.

An added advantage of the central location of the inlet valve mechanisms with respect to the compression chambers as above explained lies in the fact that the fluid compressing vanes are adapted to close the inlet valve ports upon traversing substantially one-half the distance through which they are operated, so that the unproductive work or energy otherwise required for compressing fluid within the inlet valve chambers and ports is reduced to a minimum.

Referring again to Fig. 6 of the drawings, a discharge valve disc 265 is disposed in the valve chamber 215 and is urged toward seated position by a coil spring 266 for controlling communication from the compression chamber 244 through a port 267 to the valve chamber 215. The valve chamber 215 communicates by way of a passage 269 formed in the portion 214 of the casing with the lower valve chamber 216 therein, which lower valve chamber is likewise provided with a valve disc 271 normally held in seated position by a spring 272 for controlling communication to the valve chamber from the compression chamber 245 by way of a port 273.

The valve chamber 216 is in turn connected by way of a passage 274 with the valve chamber 222, which together with the valve chamber 221 communicates by way of a passage 275 and a discharge conduit 276 with the usual receiving reser-

voir. Disposed in the valve chambers 221 and 222 are valve discs 278 and 279, respectively, which are urged toward their seated positions by springs 280 and 281. The valve disc 278 controls communication from the compression chamber 244 through a port 282 to the valve chamber 221, while the valve disc 279 controls communication from the lower compression chamber 245 through a port 284 to the valve chamber 222.

In the present embodiment of my invention, forced draft cooling means are provided for conducting a current of air through suitable communications formed within the compressor casing to augment the cooling effect provided by the exterior cooling fins 161. As is best shown in Fig. 8 of the drawings, the compressor shaft 172 is provided with a longitudinal bore 285, through which extends a rotary shaft 288 having an enlarged inner end 289 secured to the shaft 18a of the driving motor, and carrying on the outer end a fan 290 within the opening 246 of the cover plate 245. The enlarged end 289 of the shaft is provided with a threaded bore 291 adapted to receive a threaded end 292 of the shaft 18a, and is journaled in a bushing 293 mounted within the end 173 of the compressor shaft 172, so that the fan shaft 288 is thus adapted to be rotated constantly in one direction by the driving motor while the compressor shaft 172 is oscillated in periodically reversing directions as already explained. An oil duct 295 is formed in the portion 173 of the compressor shaft for admitting oil to the portion 289 of the fan shaft within the bushing 293. The outer end of the fan shaft 288 is journaled in a ball bearing assembly 297 which is carried by the hub portion 184 of the drum member.

The fan 290 is thus adapted to be operated to force a draft of air through the opening 246 in the plate member 245 and thence through the passageway formed within the drum member 183 and indicated at 300, and an annular opening 301 formed in the casing section 163, as indicated by the arrows in Fig. 8.

Operation of embodiment shown in Figs. 6 to 8

Detailed description of the operation of the compressor constructed according to the present embodiment is not deemed necessary, since the principle of operation is the same as that already described in connection with the first embodiment. In operation, the driving motor 18 functions through the medium of the shaft 18a to rotate the fan shaft 288 and fan 290 while the pinion 107 and gear 110 are at the same time operated to effect alternately reversing rotation or oscillation of the compressor shaft 172. The two vane devices 191 are thereby operated by the compressor shaft 172 through the respective compression chambers 244 and 245 for compressing fluid.

Referring to Fig. 6 of the drawings, and assuming that the fluid compressing vanes 191 are initially positioned as shown, upon rotation of the shaft 172, the drum member 183 and the vane devices in a clockwise direction, fluid is compressed in the chambers 244 and 245 in advance of the respective vane devices. Fluid under pressure is thereby discharged from the chamber 244 by way of the port 262, past the unseated discharge valve member 278, and through the chamber 221 and passage 275 to the pipe 276, while fluid under pressure is similarly discharged from the chamber 245 through the port 273, past the discharge valve member 271 and through chamber 216, passage 274 and chamber 222 to the passage 275. At the same time, a partial vacuum is created in the portions of the compression chambers 244 and 245 rearwardly of the vane devices 191, until each vane device overpasses the corresponding inlet port 260 or 261, whereupon the inlet valve devices contained in the valve portions 252 and 253 are operated to admit air from the atmosphere to both compression chambers in preparation for the subsequent return stroke of the vane devices.

Upon completion of the clockwise stroke of the vane devices 191, the reciprocating drive mechanism is operated in the manner hereinbefore explained to rotate the shaft 172 and the vane devices in the reverse direction, at which time the discharge valve elements 278 and 271 are of course returned to their seated positions by the spring 280 and 272, while the inlet valve mechanisms likewise assume their closed positions. When the compressor shaft 172, drum member 183 and vane devices 191 are thus turned in a counterclockwise direction, fluid under pressure is this time forced from the chamber 244 through the port 267, past the discharge valve element 265, and through chamber 215, passage 269, chamber 216, passage 274 and chamber 222 to the passage 275, while fluid under pressure is also forced from the chamber 245 by way of the port 284 and chamber 222 to the passage 275. It will be understood that the passage 275 is sufficiently large to permit fluid under pressure in the valve chamber 222 to flow therefrom to the receiving reservoir at such a rate as to prevent undesired build up of substantial back pressure on the valve disc 279 which might otherwise tend to oppose unseating of that disc under the pressure of fluid in the port 284. When the vane devices 191 are thus moved in a counterclockwise direction past the inlet port 260 and 261, atmospheric air is again admitted to the portion of each chamber at the trailing sides of the respective vane members as already explained.

Embodiment shown in Fig. 9

A compressor having a design similar to that shown in Fig. 8, may if desired be provided with forced draft cooling means of somewhat different form, as shown in Fig. 9 of the drawings. According to this form of the invention there is provided a compressor 305 adapted to be mounted on the gear housing 151 and operatively connected to the drive shaft 18a of the motor 18 through the medium of the usual gears 107 and 110, together with the oscillating drive mechanism already described. The compressor 305 may be of substantially the same construction as that shown in Fig. 8 and will be briefly described for the purpose of disclosing the cooling features thereof not included in the other embodiment just referred to.

The compressor 305 comprises a casing 306 having formed therein suitable compression chambers adapted to have fluid compressing vanes 307 mounted therein, which vanes are carried by a drum member 308 that is secured to a compressor shaft 309 journaled in the casing. The compressor shaft 309 is, like the shaft 172 shown in Fig. 8, operative by the oscillating drive mechanism contained in the housing 151 to operate the compressor vanes 307 to compress fluid in the manner hereinbefore explained. The drum member 308 includes a hub portion 310 secured to the peripheral portion of the member by spaced web portions 311, which extend between

passageways 312. Formed on the interior wall of the drum member 308 are longitudinally disposed radiating fins 313. The passageways 312 of the drum member are at one end adapted for communication with the atmosphere by way of an annular opening 315 formed in the casing section intermediate the compressor 305 and the gear housing 151, and at the other end communicate with an opening 316 provided in the outer end of the casing 306. A plurality of radiating fins 317 are formed on the wall of the opening 316.

Formed on the exterior surface of the casing 306 of the compressor are a plurality of longitudinally disposed heat radiating fins 319, which are enclosed within a substantially cylindrical cover 320, which may be formed of sheet steel or the like and is adapted to be secured to the casing 306 by means of screws 321. The cover 320 is provided with a plurality of louvers 323, which are disposed upon the member adjacent the portion thereof engaging the casing 306. The outer end of the cover member 320 extends beyond the casing member 306 and has formed therein a circular opening 324, within which is disposed a fan 325 that is secured to a rotary shaft 326 operatively connected to the driving motor shaft 18a by means similar to that associated with the shaft 288 shown in Fig. 8. It will be apparent that the blades of the fan 325 are long enough to extend across substantially the full area of the outer end of the casing 306.

In operation, while the fluid compressing vanes 307 are oscillated in the usual manner for compressing fluid through the medium of the compressor shaft 309, the fan shaft 326 is constantly rotated in one direction for operating the fan 325 to draw atmospheric air through the opening 315, openings 312 in the drum member 308, opening 316 in the casing 306 and outwardly by way of the opening 324 in the cover member 320. At the same time atmospheric air is also drawn through the louvers 323 in the cover member and passes over the fins 319 and outwardly through the opening 324. It will be apparent that heat of compression radiated from the compressor by means of the fins 319, and also by the interior fins 313 and 317, will be rapidly carried away from the compressor, so that the compressor will be sufficiently cooled at all times.

Description of embodiment shown in Figs. 10 to 13

Illustrated in Figs. 10 to 13, inclusive, is a fluid compressor of the oscillating piston or vane type embodying features of the invention in another form. In this embodiment of the invention, there is provided a fluid compressor indicated generally at 330, which will be understood to correspond to the compressor 15 shown in Fig. 3 and the compressor 150 shown in Fig. 6. It is not deemed necessary to provide detailed illustration of the compressor 330 in association with an oscillating driving means, since the construction and operation of suitable driving mechanisms have already been explained in connection with the other embodiments of the invention.

As shown in Fig. 10 of the drawings the compressor 330 comprises a substantially cylindrical casing 331 having a central bore 332 formed therein and an oscillating drum member 335 keyed to a concentrically disposed compressor shaft 336, which is suitably journaled within the casing. The casing 331 is provided with exterior annular radiating fins 338. Formed on opposite sides of the casing are two arcuate depressions or channels 341 and 342, at the margins of which are mounted pairs of parallel guide members 343 and 344, respectively.

The guide members 343 together with the channel 341 provide a concave sealing surface adapted to receive a substantially cylindrical sealing device 346, which is rotatably mounted on a longitudinally disposed pin 347 extending between the guide members. As shown in Fig. 10, the outer curved surface of the sealing device 346 is adapted for sealing engagement with the channel 341 and associated guide members 343, and is provided with a relatively flat portion adjacent the drum member 335 which has formed thereon a sealing surface 348 adapted for sliding engagement with the drum member.

As is best shown in Fig. 12 of the drawings, the sealing device 346 is of two piece construction, and comprises a pair of elements 350 and 351 made of the self-lubricating carbonaceous material hereinbefore described and adapted to be adjustably interlocked together, the element 350 having a transverse groove 352 adapted to receive a tongue portion 353 of the element 351. The elements 350 and 351 are provided with interior bores within which are mounted coil springs 355 which are adapted to urge the elements apart and into sealing engagement with circular end plate members 358 and 359, respectively, which are concentrically mounted within the casing 331 and are supported in part by the pin 347. It will be noted that the pin 347 has a head portion 347a in engagement with the outer surface of a plate member 358, and that a screw-threaded member 361 is attached to the other end thereof beyond the plate member 359. A coil spring 362 is interposed between and secured to the screw-threaded member 361 and the plate member 359, and acts against that plate member and through the medium of the pin 347 and the other plate member 348 to urge both said members inwardly.

Referring again to Fig. 10, it will be observed that the element 351 of the sealing device 346 is provided with a projecting lug member 365, which extends through a slot 366 formed in the casing within the channel 341, and which lug member is disposed in alignment with a lug 367 projecting from the casing. A tension spring 368 is connected to the lugs 365 and 367 to impart torque to the sealing device 346 for maintaining the sealing surface 348 thereof in sliding contact with the drum member 335.

Disposed in sliding engagement with the guide members 344 and the adjacent channel 342 is a substantially cylindrical sealing device 371, which, like the sealing device 351 comprises separate elements made of carbonaceous material adjustably fitted together and adapted for rotation about a longitudinally disposed pin 372. The pin 372 is adapted to be mounted at each end in the respective end plate members 358 and 359 in the manner hereinbefore described in connection with the pin 347 shown in Fig. 12. Coil springs 373 are interposed between the two elements of the sealing device 371 for insuring sealing engagement of the end surfaces thereof with the end plate members. A tension spring 375 is provided for subjecting the sealing device 371 to sufficient torque to urge the sealing face 376 thereof into constant engagement with the drum member 335, one end of the spring being connected to a lug 377 and the other end to a lug element 379 having screw-threaded connection

with one of the elements of the sealing device.

The sealing devices 346 and 371 are adapted to divide the space between the rotary drum member 335 and the wall of the bore 332 into two compression chambers, indicated generally at 382 and 383 in Fig. 10.

According to this form of the invention, rotatably mounted vane devices 385 are carried by the drum member 335, each of which devices is substantially cylindrical in form and is disposed in sliding engagement within a suitable channel provided by a pair of guide members 386 secured to the drum member by means of screws such as 387. As is best shown in Fig. 11 in the drawings, each vane device 385 comprises two slidably fitted elements 388 and 389, the element 388 having a transversely disposed groove 390 adapted to receive a suitably shaped tongue portion 391 formed on the element 389. A coil spring 393 is interposed between the elements for causing the end surfaces thereof to seal against the end plate members 358 and 359, which members are, in addition, provided with annular recesses containing ring-like carbonaceous sealing members 395 and 396, respectively, for insuring against leakage of fluid under pressure from either of the compression chambers during operation of the compressor.

The drum member 335 is provided with apertures 400 formed in the hub portion thereof adjacent the respective vane devices 385, through each of which apertures is disposed a coil spring 401 having one end thereof connected to a lug 402 carried by the adjacent element of the vane device 385 and the other end disposed on a seat portion 405 of the drum member 335. Each of the springs 401 is adapted to urge the corresponding sealing member 385 in a counterclockwise direction about the center thereof, as viewed in Fig. 10 of the drawings, so as thereby to insure constant sliding engagement of a sealing surface 406 with the wall of the bore 332. Referring to Fig. 11, it will be observed that the aperture 400 in the drum member is suitably offset with respect to the tongue and groove portions of the elements 388 and 389 of the sealing device 385, so that possible leakage of the fluid under pressure therepast is prevented.

It will now be understood that the vane devices 385 are relatively oscillated or rotated in periodically reversing directions through the medium of the drum member 335 and shaft 336 in the manner hereinbefore explained. As the vane members 385 are thus moved through the compression chambers 382 and 383, each of the longitudinally disposed guide members 386 carried by the drum member is adapted to be freely movable into and out of the spaces provided between the corresponding stationary guide members 343 or 344 and the drum member, so that maximum displacement of fluid is ensured.

Two inlet valve assemblies are provided for controlling the inlet flow of air or other fluid to the respective compression chambers. Referring to Fig. 10 of the drawings, the casing 331 has formed thereon a valve portion 410 disposed adjacent the compression chamber 382 and a valve portion 411 adjacent the compression chamber 383, each of which valve portions is adapted to contain an inlet valve assembly, which may be of any suitable type and is not shown in detail in the drawings. The valve assembly within the valve portion 410 is adapted to admit fluid to the compression chamber 382 by way of a passage 410*a* which communicates with the compression chamber at a point substantially midway of the stroke traversed by the vane device 385. Similarly, the valve mechanism contained in the valve portion 411 communicates with the compression chamber 383 through central port 411*a*. The ports 410*a* and 411*a* are thus adapted to be controlled in accordance with movement of the vane devices 385 for admitting fluid to the compression chambers in the same manner as that hereinbefore explained with the embodiment of the invention shown in Fig. 6 of the drawings.

The casing 332 is also provided with four discharge valve chambers 412, 413, 414 and 415, which are arranged radially about the compressor casing and are in communication with an annular manifold discharge passageway 416, which is formed in the casing 332 and is connected by way of a passage and pipe 417 with the usual receiving reservoir, not shown. The valve chambers 412 and 413 are adapted to communicate with the compression chamber 382 at the terminal ends thereof by way of passages 419 and 420 respectively. A spring pressed valve element 421 is disposed in the valve chamber 412 for controlling communication thereto from the compression chamber 382. Similarly, the valve chamber 413 is provided with a spring pressed valve element 422 which is adapted to control discharge of fluid under pressure from the compression chamber 382 to the valve chamber. Spring pressed valve elements 425 and 426 are likewise mounted in the valve chambers 415 and 414, respectively, and control communication to said chambers from the compression chamber 383 by way of passages 427 and 428. The discharge valve passages 427 and 428 are connected to the terminal ends of the compression chamber 383.

Operation of embodiment shown in Fig. 10

In operation, the compressor 330 functions in substantially the same manner as do the compressors 15 and 150 previously described and illustrated in Figs. 3 and 6. In Fig. 10 the shaft 336, drum members 335 and vane devices 385 carried thereby are shown in intermediate position. Assuming that the compressor shaft 336 is initially rotated in a clockwise direction, it will readily be understood that the upper vane device 385 is thereby moved toward the sealing member 371 for compressing fluid in the chamber 382, which fluid is discharged past the valve element 422 to the discharge passageway 416, while at the same time the lower vane device 385 is operated to compress fluid at the leading side thereof within the chamber 383, which fluid under pressure is discharged past the valve element 415 to the passageway 416 and thence to the receiving reservoir. During this movement of the vane devices 385, the respective inlet valve ports 410*a* and 411*a* are uncovered as the sealing surface 406 of the corresponding vane devices are moved beyond the intermediate position, whereupon air or other fluid is supplied to the portions of the chambers 382 and 383 at the trailing sides of the two vane devices. Upon completion of the clockwise stroke of the vane devices, the usual oscillating drive mechanism associated with the compressor quickly reverses the direction of rotation of the compressor shaft 336, so that the vane devices 385 are then moved in a counterclockwise direction through the chambers 382 and 383, thereby effecting supply of fluid under pressure by way of the valve elements 421 and 426 to the discharge passageway 416. As the vane devices 385 are thus moved past the inlet valve ports, the inlet valve mechanisms are again operated to supply

fluid to the suction portion of each of the compression chambers in preparation for the next clockwise stroke of the vane members.

According to the embodiment of the invention disclosed in Fig. 10, the two sealing devices **346** and **371** controlled by the respective springs **368** and **375**, together with the vane devices **385** carried by the drum member and subject to the springs **401**, are thus adapted to be automatically adjusted to compensate for wear during operation of the compressor. Such adjustment for wear in the case of one of the vane devices **385** is illustrated, in somewhat exaggerated form, in Fig. 13 of the drawings. On the other hand, it is to be expected that, due to the self-lubricating quantities of the carbonaceous material of which the sealing devices and vane devices are composed, wearing thereof will be gradual. The supply of oil or other fluid lubricant to the compressor is of course not required.

Conclusion

It will now be apparent that I have disclosed several embodiment of the invention, in each of which is provided a compressor of compact construction comprising an operating shaft adapted to be oscillated or periodically rotated in alternately reversing directions through a predetermined angle, and self-lubricating movable abutments or vanes of carbonaceous material operative thereby within arcuate compression chambers for effecting supply of fluid under pressure by way of suitable valve means. By reason of this construction, the compressor operating shaft may be made short and sturdy, and is designed to carry the operating parts such as the vanes in substantially balanced relation in order to reduce possible vibration and noise of operation, while the two vanes are adapted to traverse long compression strokes in relation to the areas thereof, so that the load reacting on the bearings of the assembly in minimized. As a further feature, certain of the operating elements including the fluid compressing vanes are provided with means effecting automatic adjustment thereof to compensate for wear. In addition, the various parts of the compressor are adapted to be readily assembled, and are arranged to provide automatic forced draft air cooling during operation.

Although several embodiments of the invention have been described in detail, it should be understood that I do not intend to limit the scope of the invention to those embodiments or otherwise than by the terms of the appended claims.

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

1. In a fluid compressor, in combination, a casing having a substantially circular interior wall, a cylindrical drum member rotatably mounted in said casing and disposed concentrically of said wall, said drum member having concave guide channels formed longitudinally on opposite sides thereof, sealing means mounted in said casing and including means yieldingly engaging said drum member for defining separate compression chambers within said circular wall, fluid compressing vane members having convex surfaces complementary to and slidably fitted in said guide channels, respectively, means resiliently urging each of said vane members in a rotary direction for effecting sliding engagement of a portion thereof with said wall, inlet and outlet valve means for said compression chambers, and driving means operable to oscillate said drum member for causing said vane members to compress fluid within the corresponding compression chambers.

2. In a fluid compressor, in combination, a casing having a substantially circular interior wall, a cylindrical drum member rotatably mounted in said casing and disposed concentrically of said wall, said drum member having concave guide channels formed longitudinally on opposite sides thereof, sealing means mounted in said casing including members yieldingly engaging said drum member for defining separate compression chambers within said circular wall and end plate means associated therewith for closing the ends of said chambers, inlet and outlet valve means associated therewith, fluid compressing vane members having convex surfaces complementary to and slidably fitted in said guide channels respectively, said vane members individually comprising a pair of slidably interlocked elements and spring means urging said elements apart for insuring sealing engagement of the end surfaces thereof with said end plate members, means resiliently urging each of said vane members in a rotary direction into sliding engagement with said interior wall of the casing, and driving means operable to oscillate said drum member for causing said vane members to compress fluid within the corresponding compression chambers.

3. In a fluid compressor, in combination, a casing structure having arcuate compression chambers, fluid compressing vane members slidably mounted in said chambers and operative to compress fluid, a shaft member journaled in said casing structure concentrically of said chambers and operable to effect oscillation of said vane members through said chambers, said shaft member having a longitudinal bore, a rotary motor driven element aligned with said shaft, mechanism cooperative with said element for effecting alternately reversing rotation of said shaft and vane members, fan means operable to produce an air current for cooling the compressor, and a fan shaft journaled within said bore in the first-named compressor shaft and operatively connected to said motor driven element for constantly rotating said fan means during operation of the compressor.

4. An air compressor of the type adapted to be driven by a motor or the like, comprising a stationary casing structure including a cylindrical portion having a bore and a single bearing portion disposed concentrically thereof and extending into said cylindrical portion bore, a drive shaft having a free outer end, and an inner end journaled in and supported by said bearing portion, said drive shaft having the free end thereof disposed outwardly of said bearing portion and within said cylindrical portion of the casing structure, a hollow drum member secured to said free end of the drive shaft and disposed coaxially of the bore in said cylindrical portion, said drum member being adapted to overhang a part of said bearing portion, sealing elements resiliently mounted in said cylindrical portion in sliding engagement with said drum member for defining a plurality of separate compression chambers within said bore, inlet and outlet valve means for said compression chambers, a plurality of piston vane devices yieldingly mounted on said drum member and respectively disposed in sliding engagement with the walls of said compression chambers, and driving means operable to effect periodically reversing rotation of said drive shaft

for causing oscillation of said vane devices through said chambers.

5. A fluid compressor of the type adapted to be driven by a motor or the like, comprising a casing structure including a cylindrical portion having a bore and having its sole support at one end, a single bearing portion carried concentrically of said cylindrical portion and disposed at least in part within said cylindrical portion bore, a drive shaft having a free outer end, and an inner end journaled in and supported by said bearing portion, said free end extending there-beyond into said bore of said cylindrical portion of the casing, a cylindrical drum member secured to said free end of the drive shaft and having an interior cooling passage, said cooling passage being adapted to receive a part of said bearing portion, resilient sealing means associated with said cylindrical portion of the casing structure and slidably engaging said drum member for defining a plurality of separate compression chambers, inlet and discharge valve means for said compression chambers, vane means resiliently mounted on said drum member and respectively disposed in sliding relation with the walls of said compression chambers, and driving means operable to effect periodically reversing rotation of said drum member.

6. A fluid compressor of the type adapted to be driven by a motor or the like, comprising a casing structure including a cylindrical portion having a bore and having its sole support at one end and a single bearing portion carried concentrically of said cylindrical portion and disposed at least partly within said cylindrical portion bore, a drive shaft having one end journaled in and supported by said bearing portion and having another end extending there-beyond into said bore of said cylindrical portion of the casing, a hollow cylindrical drum member having a hub portion secured to said other end of the drive shaft and having an interior cooling chamber the peripheral wall of which is adapted to extend in overlying relation with said bearing portion, sealing means associated with said cylindrical portion of the casing and slidably engaging said drum member for defining a plurality of separate compression chambers, inlet and discharge valve means for said compression chambers, vane means resiliently mounted on said drum member and respectively disposed in sliding relation to the walls of said compression chambers, and driving means operatively connected to the other end of said drive shaft closely adjacent said bearing means for imparting oscillatory motion to the drive shaft.

7. In a fluid compressor: a hollow cylindrical casing structure having a longitudinal bore, a cylindrical drum member of smaller diameter than that of the bore and rotatably mounted in said casing structure coaxially of said bore, said drum member having a relatively thin wall providing a passageway constructed and arranged to conduct a stream of cooling air therethrough, means constructed and arranged to define a plurality of compression chambers including a plurality of sealing members operatively mounted in said casing structure and projecting into yielding engagement with said drum member, means carried by said casing structure and constituting end walls for said compression chambers, inlet and outlet valves for said chambers, a plurality of vane devices yieldingly mounted in balanced relation on said drum member, said vane devices having sliding engagement with the walls of said compression chambers, rotary blower means arranged to force cool air through the passageway in said drum member, and driving means constructed and arranged to effect periodically reversing rotation of said drum member while causing unidirectional operation of said blower means.

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