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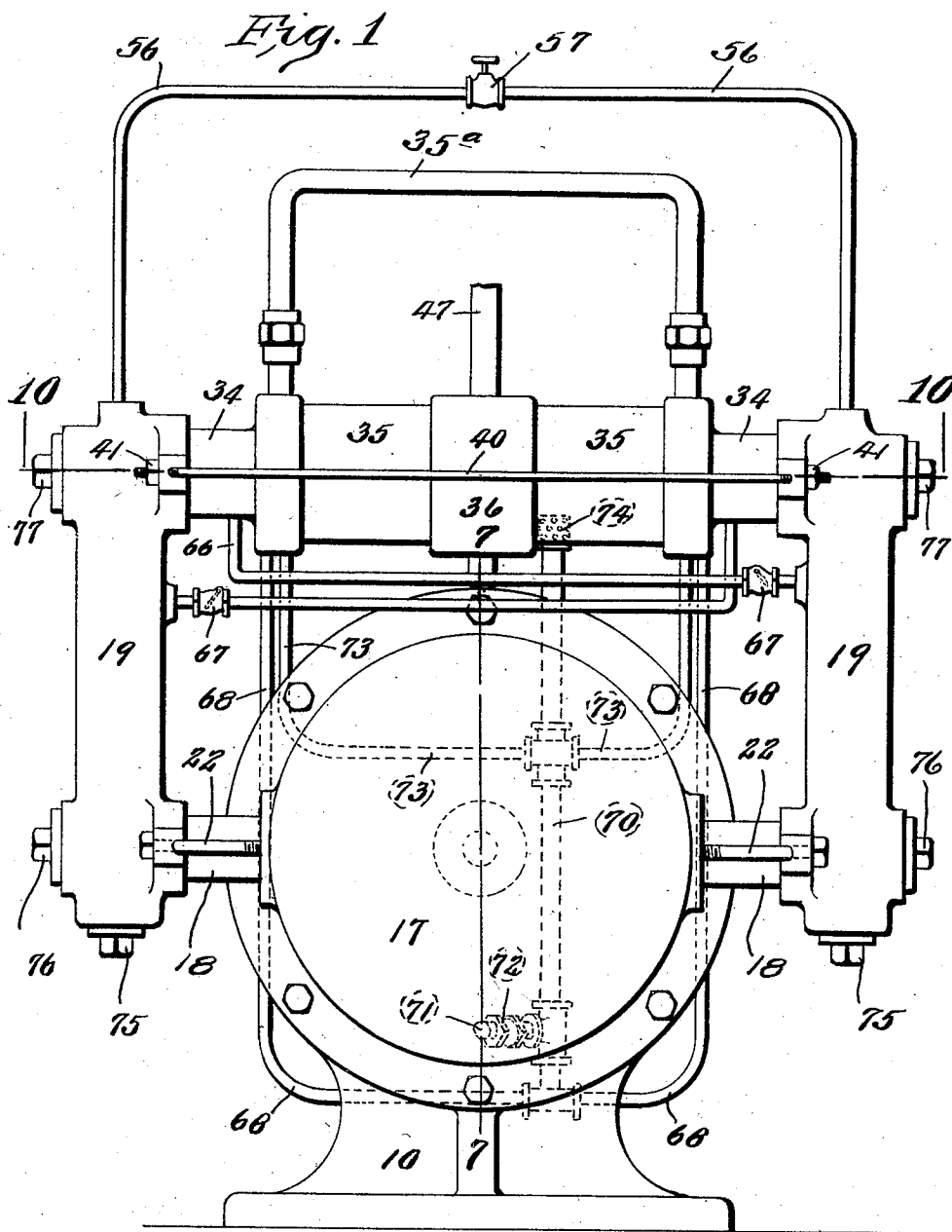
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J. O. CARREY

AIR COMPRESSOR

Filed August 8, 1922

8 Sheets-Sheet 1



Inventor
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By J. R. Cornwall

March 16, 1926.

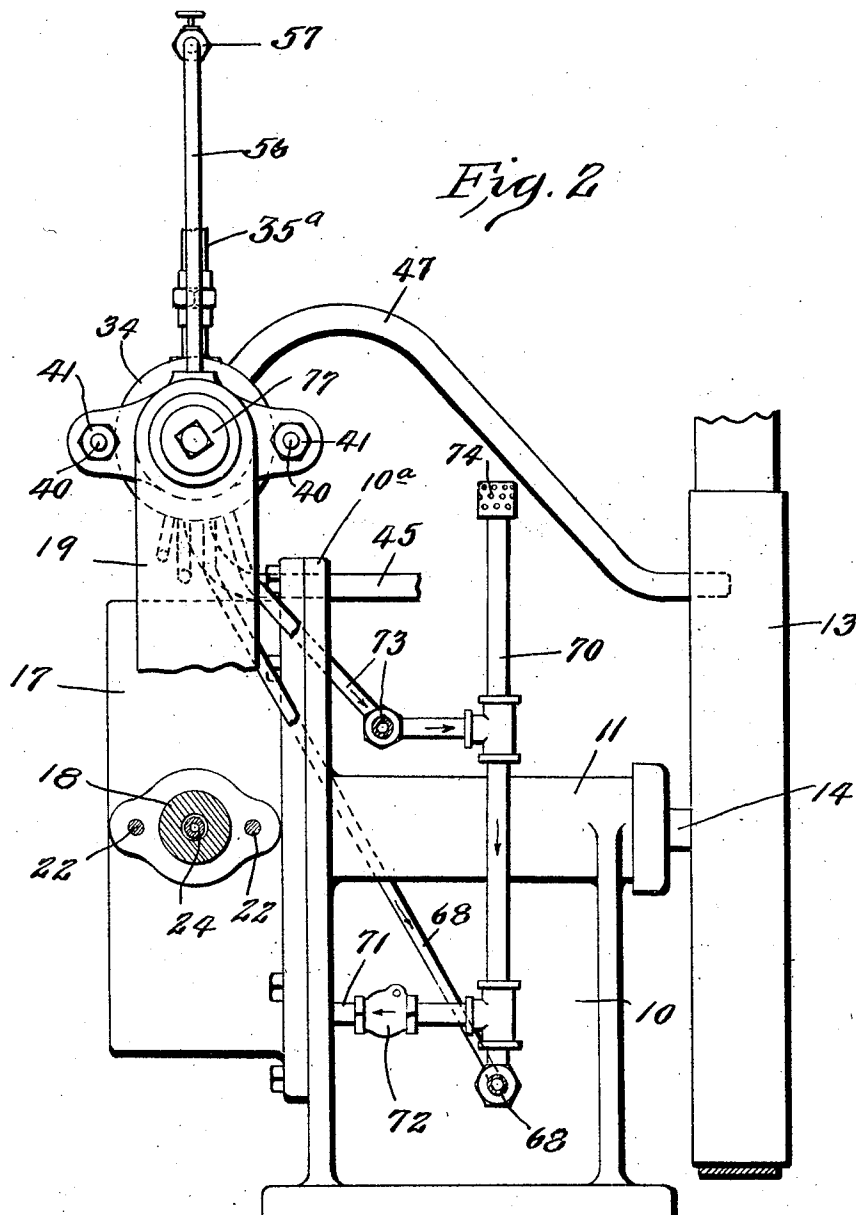
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AIR COMPRESSOR

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8 Sheets-Sheet 2



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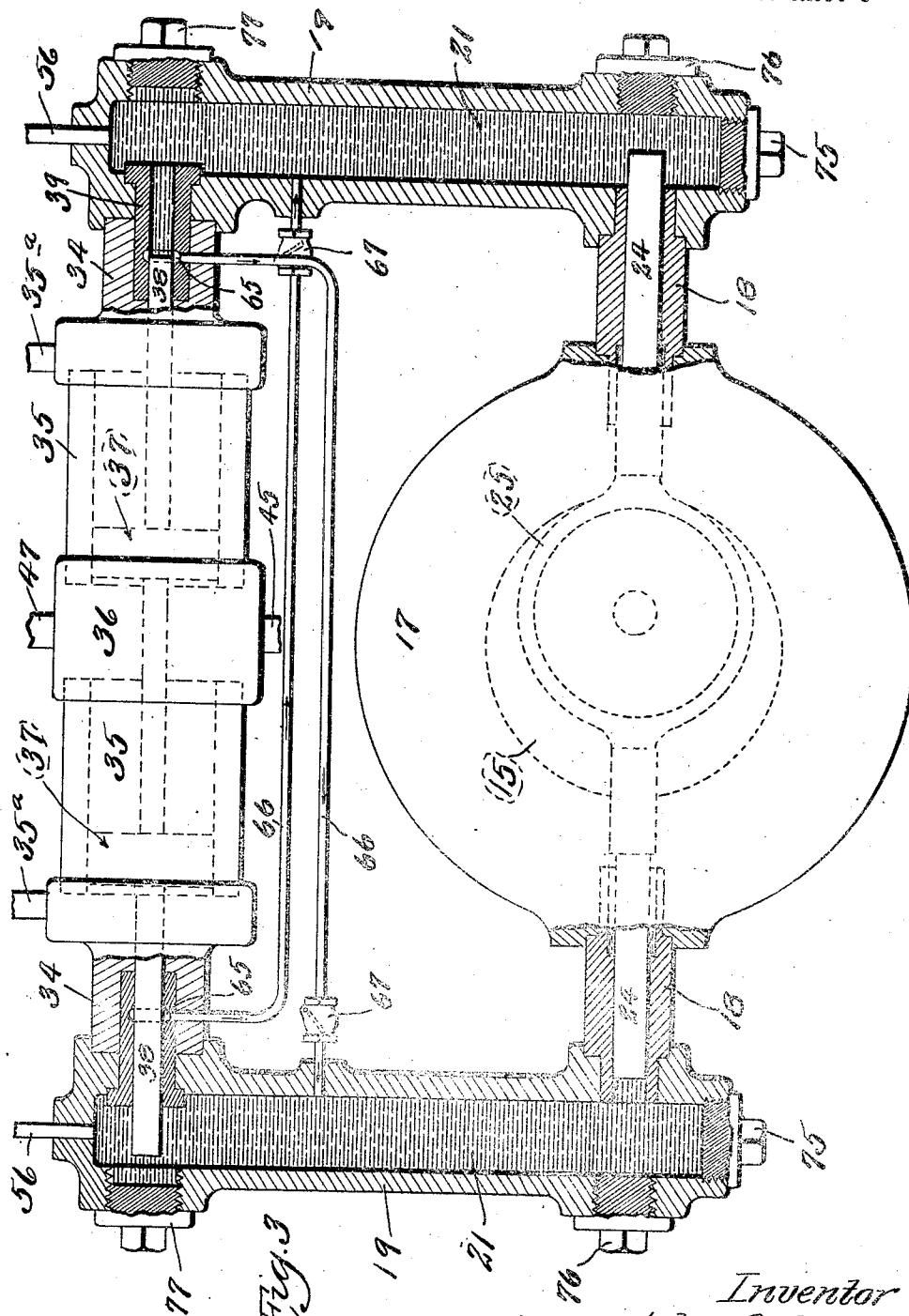
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AIR COMPRESSOR

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March 16, 1926.

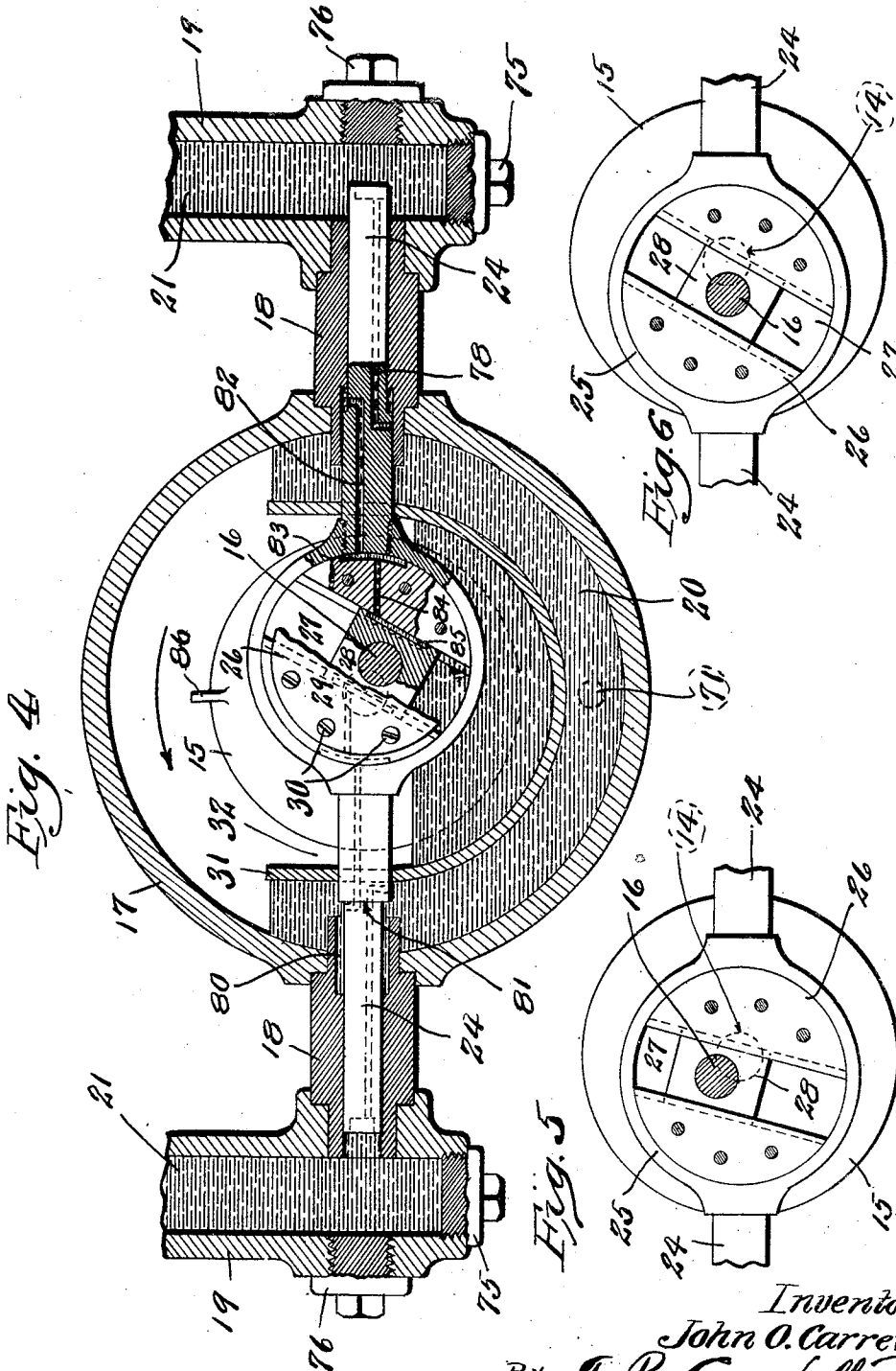
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AIR COMPRESSOR

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8 Sheets-Sheet 4



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AIR COMPRESSOR

· Filed August 8, 1922

8 Sheets-Sheet 5

Fig. 7

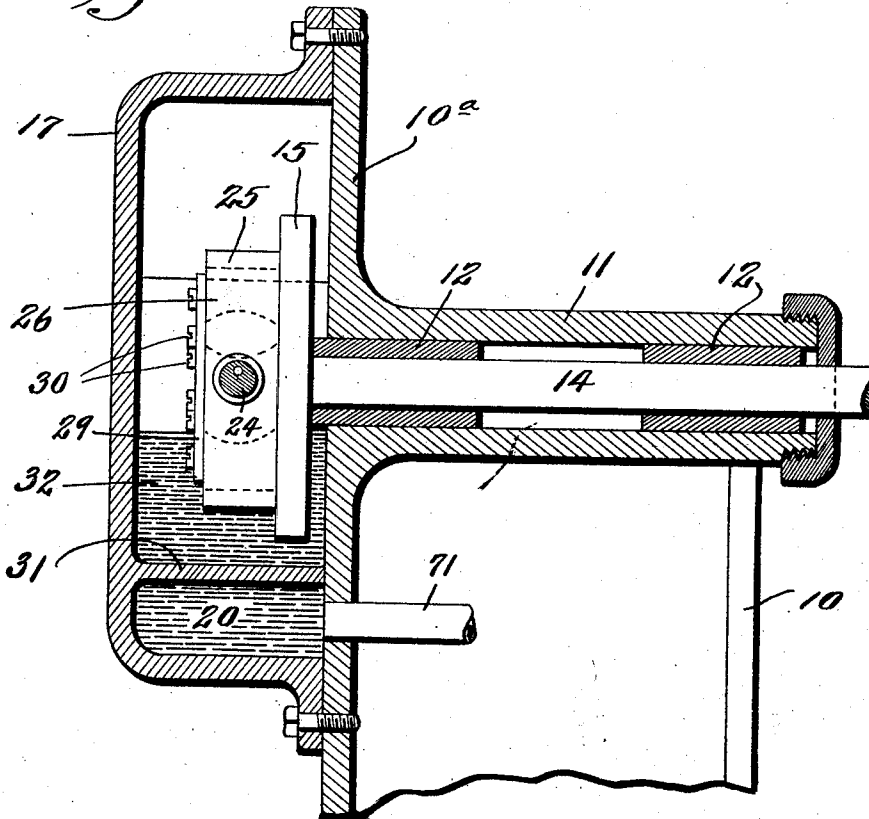


Fig. 9

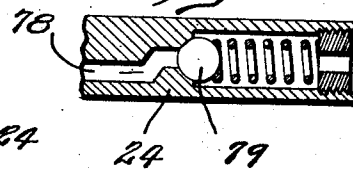
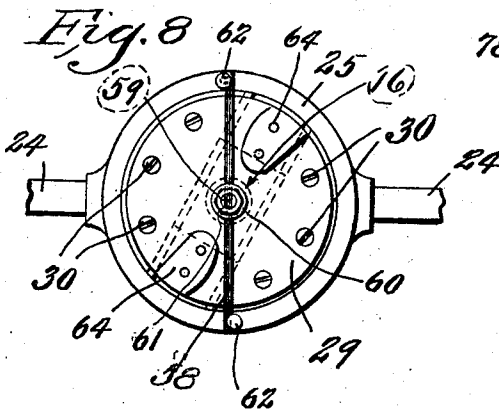


Fig. 8



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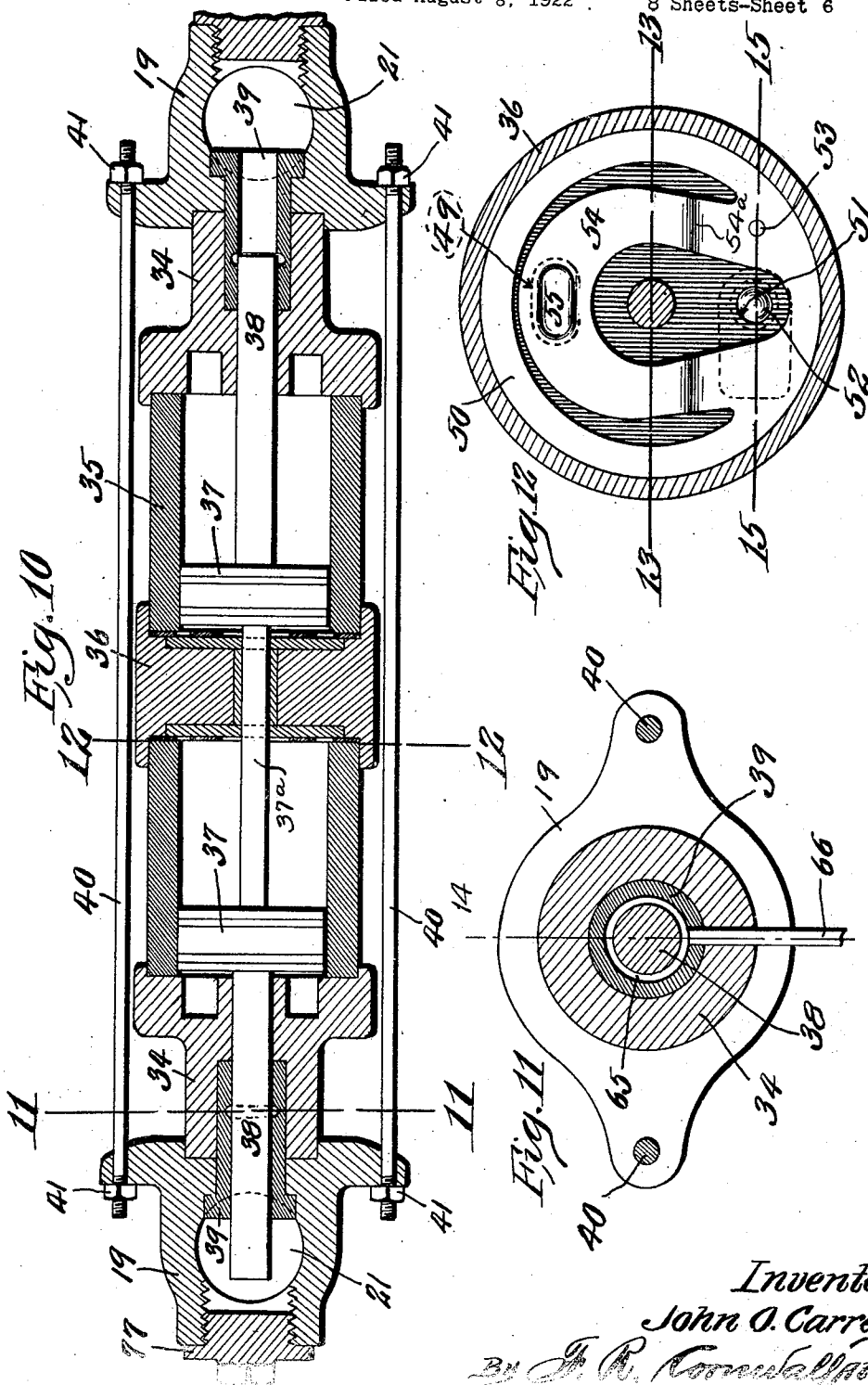
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AIR COMPRESSOR

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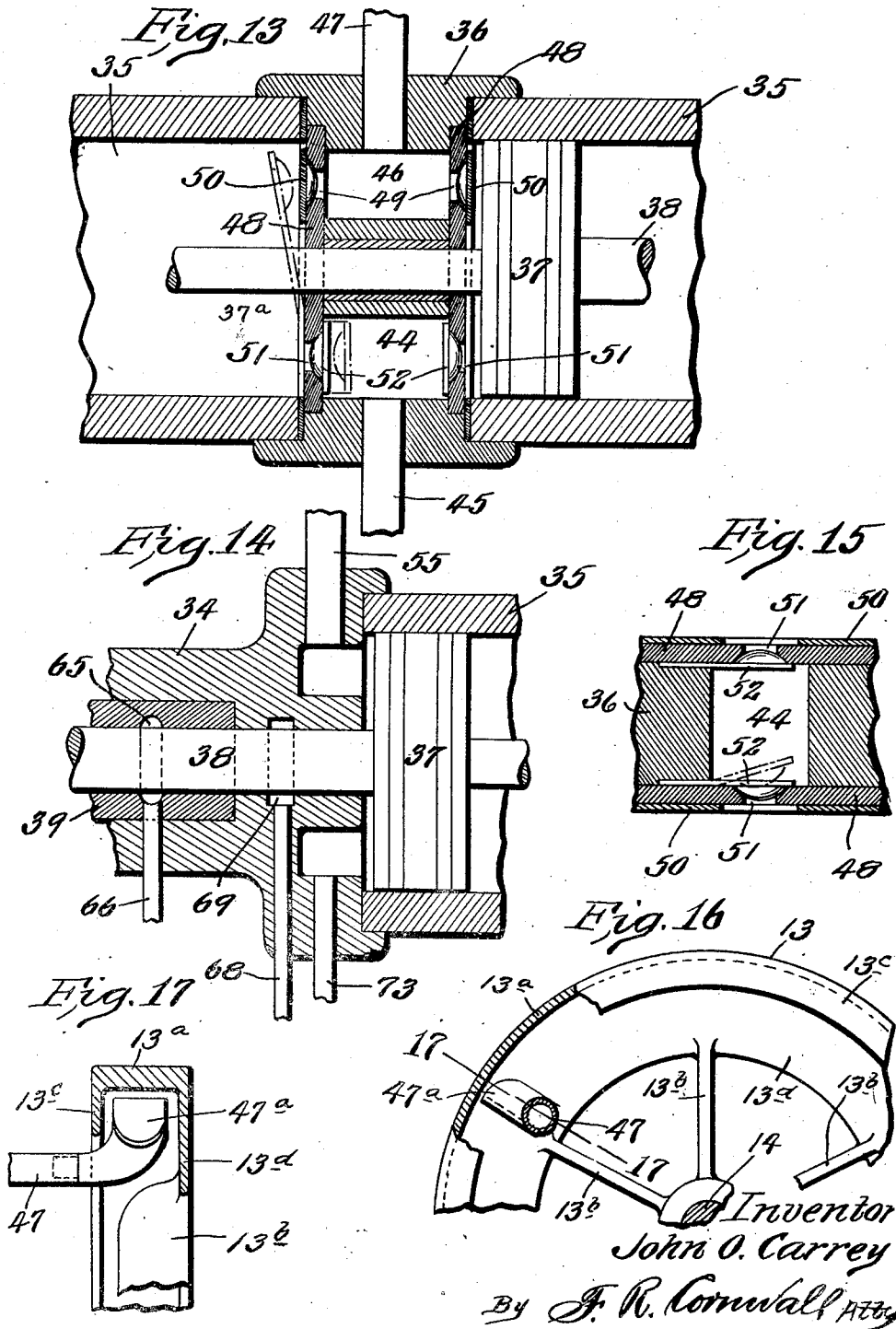
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AIR COMPRESSOR

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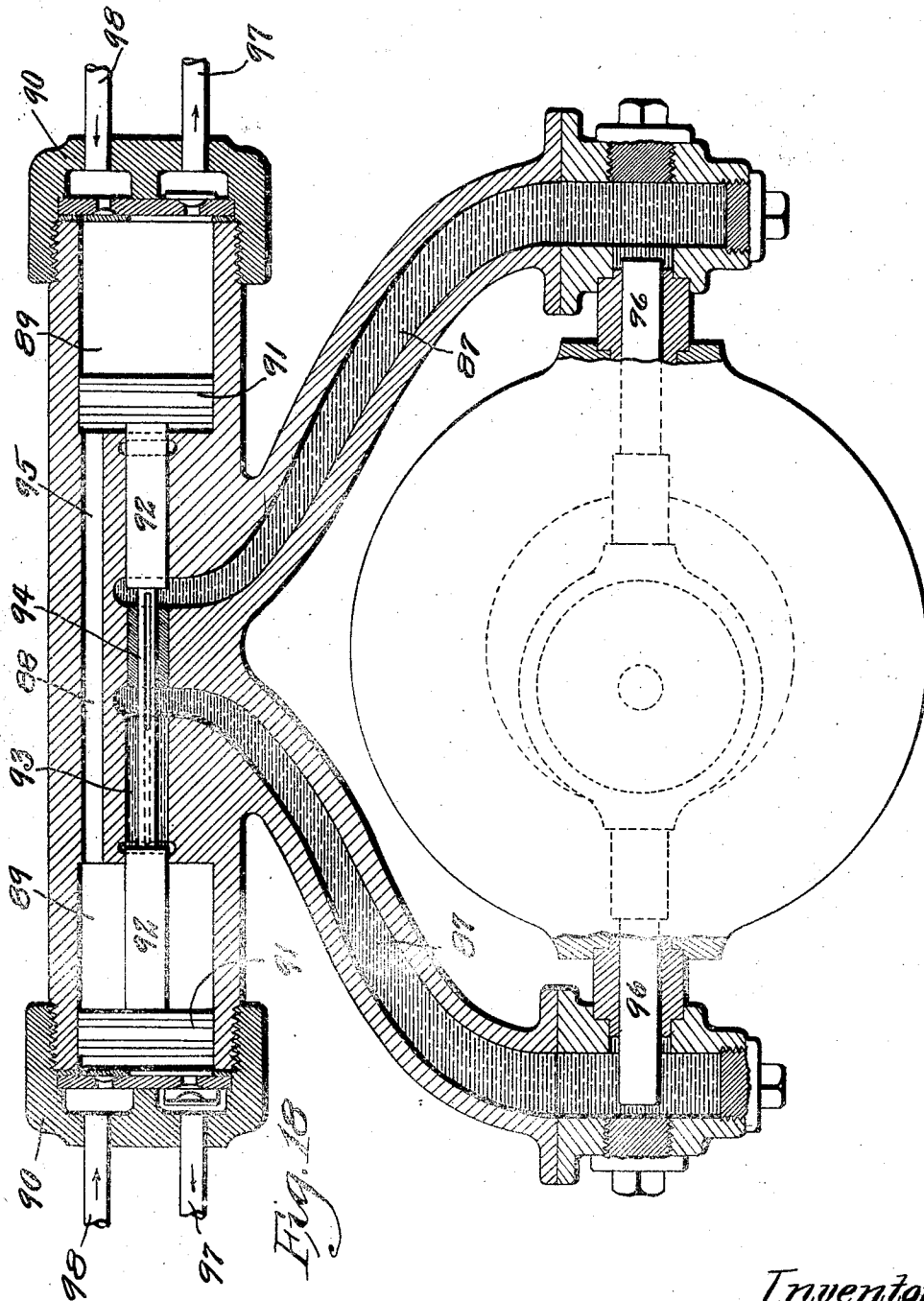
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AIR COMPRESSOR

Filed August 8, 1922

8 Sheets-Sheet 8



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UNITED STATES PATENT OFFICE.

JOHN O. CARREY, OF ST. LOUIS, MISSOURI, ASSIGNOR TO CARREY-MORSE ENGINEERING COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

AIR COMPRESSOR.

Application filed August 8, 1922. Serial No. 580,386.

To all whom it may concern:

Be it known that I, JOHN O. CARREY, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Air Compressors, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this application.

This invention relates to new and useful improvements in air compressors and the principal objects of the invention are to generally improve upon and simplify the construction of air compressors and to increase the efficiency thereof.

Other objects of the invention are to provide an air compressor having a speed variable driving connection whereby the speed of the pistons is automatically varied in accordance with the load during the compression stroke of the device.

Further objects of the invention are to mount the crank pin in a block slidably mounted in an angularly disposed slot formed in a floating member, the latter being arranged in a ring on which the primary pistons are mounted so that during the last half of the compression stroke, the pressure exerted against said floating member causes the latter to be partially rotated, thus changing the angle of the slot and automatically retarding the speed of the pistons.

Still further objects of the invention are to provide a set of primary or main pistons operable by suitable driving means and acting upon liquid contained in suitable pressure chambers and a set of secondary pistons which are operable by liquid contained in said pressure chambers and are adapted to actuate air compressing means and to provide improved valves for the air compressing chambers.

With these and other objects in view, my invention consists in certain novel features of construction and arrangement of parts, hereinafter more fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the air compressor.

Figure 2 is a side elevation of the same.

Figure 3 is a front elevation of the air compressor with parts broken away to more clearly illustrate the invention.

Figure 4 is a vertical longitudinal cross section through the lower end of the air compressor.

Figure 5 is a detail view of the floating member and parts associated therewith, showing the former in a partially rotated position.

Figure 6 is a similar view showing the floating member at the completion of the forward compression stroke and occupying its normal angular position.

Figure 7 is a vertical cross section taken on line 7—7 of Figure 1.

Figure 8 is a front elevational view of the floating member and the external ring on which the low pressure pistons are mounted.

Figure 9 is a detail longitudinal cross section through the outer end of one of the low pressure pistons.

Figure 10 is a horizontal cross section taken on line 10—10 of Figure 1.

Figure 11 is a transverse cross section taken on line 11—11 of Figure 10.

Figure 12 is a vertical transverse cross section taken on line 12—12 of Figure 10.

Figure 13 is a horizontal cross section taken on line 13—13 of Figure 12.

Figure 14 is a vertical cross section taken on line 14—14 of Figure 11.

Figure 15 is a horizontal cross section taken on line 15—15 of Figure 12.

Figure 16 is a fragmental front elevational view of the pulley showing means for conveying the air under pressure to the inlet port of the device.

Figure 17 is a detail view taken on line 17—17 of Figure 16.

Figure 18 is a front elevational view partly in cross section of a modified form of the air compressor.

Referring by numerals to the accompanying drawings, 10 designates a casting or base having a horizontally disposed tubular hous-

ing 11 in which is journaled in bearings 12 a shaft 14. Fixed to the rear end of the shaft is a belt-driven pulley 13 and the forward end of said shaft carries a crank disk 15 on which is fixed a crank pin 16. Casting 10 has formed integral therewith and concentric with shaft 14 a circular flange 10^a to which is adapted to be bolted or otherwise secured the annular flange of a circular casing 17. The circumferential wall of casing 17 is provided on the diametrically opposite sides with openings in which are received the inner ends of bushings 18. The outer reduced ends of these bushings are seated in suitable openings formed in the lower ends of vertically disposed tubular members 19 and connect the outer oil chamber 20 of casing 17 with the respective chambers 21 of members or columns 19. Bushings 18 and the lower ends of members 19 are preferably secured to casing 17 by means of bolts 22 seated in lateral lugs on the lower ends of members 19 and having their threaded ends screw-seated in casing 17.

Operating in bushings 18 and adapted to enter chambers 21 are primary or hydraulic pistons 24, the inner ends of which are fixed to a ring or strap 25. Rotatably mounted within this ring is a floating member 26 having formed in its inner side a slot 27 which is angularly disposed relative to the axes of pistons 24. Slidably arranged in slot 27 is a block 28 in which operates crank pin 16 of disk 15. The sides of slot 27 are preferably concave in cross section and the slot engaging sides of block 28 are convex in order to form a snug fit.

The floating member 26 can be formed in any suitable manner and in the present instance consists of two segments held in their relative positions by means of a circular plate 29 and suitable fastening means 30. The outer oil chamber 20 is formed by providing casing 17 with a partition wall 31 which is spaced inwardly from the circumferential wall of the casing and extends upwardly a suitable distance above pistons 24. Crank disk 15, ring 25, and parts associated therewith are located in the inner oil chamber 32 formed by said wall and are lubricated by oil contained therein.

The upper end of each column or member 19 is provided with a circular seat designed to receive the reduced end of a piston casing 34. The enlarged opposite end of each piston casing is provided with an annular seat for receiving the outer end of an air cylinder 35, and the inner ends of these cylinders are seated in annular seats formed in the ends of a centrally arranged valve casing 36. Operating in each air cylinder 35 is a piston 37 and the two pistons are interconnected by a rod 37^a, which latter is slidably mounted in a bearing formed in valve casing 36. Projecting outwardly from each air piston

37 is a secondary hydraulic piston 38, the diameter of which is smaller in proportion to piston 24.

The end of each secondary piston 38 operates through a bushing 39 and is designed to enter the upper end of the respective oil pressure chamber 21. Bushings 39 are preferably seated in the upper ends of members 19 and project into the reduced ends of piston casings 34. Valve casing 36, cylinders 35, casings 34 and bushings 39 are in axial alignment with each other and are held in assembled relation by means of tie rods 40, the threaded ends of which pass through apertures formed in lugs projecting laterally from members 19 and receive nuts 41.

Valve casing 36 is divided into two chambers, one of which is a high pressure chamber 44 having outlet pipe connections 45 and the other is a low pressure chamber 46 having an inlet pipe connection 47. Plates 48 are disposed in each end of valve casing 36 and close communication between cylinders 35 and chambers 44 and 46 so that no air can pass therebetween except through inlet openings 49 formed in said plate and controlled by low pressure valves 50 and cylinder outlet openings 51 also formed in said plates and controlled by high pressure valves 52.

Each high pressure valve 52 is formed of a comparatively thin metal plate, one end of which is clamped between casing 36 and plate 48 while the free end projects within chamber 44 and is provided with a semi-spherical protuberance which is designed to be seated in and yieldingly close outlet opening 51. Low pressure valves 50 are formed from a disk of thin metal, the inner portion of which is cut or stamped out to provide an inverted U-shaped member 54, the ends of which are united with the ring portion 54^a.

The U-shaped portion 54 has formed thereon a valve 55 which is designed to be seated in and close the inlet opening 49 of the respective plate 48. These valves open inwardly into the respective cylinders and the legs of the U-shaped portion form resilient means for holding said valves to their seats in inlet openings 49.

In order to prevent accidental displacement of valve 55 during assembling, casing 36 is provided with outwardly projecting pins 53 which are designed to engage apertures suitably located in valve members 50.

In the operation of the valves, air is drawn into the respective cylinder during the expansion stroke of piston 37 through inlet pipe 47 into chamber 46, from which it passes through inlet opening 49 to said cylinder. Valve 55 is unseated during the expansion stroke of pistons 37 while valve 52 remains seated, and closes outlet opening 51. Upon reversal of the direction of travel of

piston 37, valve 55 is closed and the air contained in this cylinder is compressed to a definite point whereupon valve 52 opens and permits the compressed air to escape into chamber 44, thence through pipe 45 to a suitable reservoir.

The outer or opposite ends of air cylinders 35 are bridged or interconnected by a pipe connection 35^a which acts as a by-pass and balances the pressure between these ends. Extending upwardly from the upper ends of each member 19 is a pipe or by-pass connection 56 the ends of which are connected by a manually operable valve 57.

In starting the operation of the device, valve 57 is opened so that the oil can pass from one member 19 to the other and become balanced whereupon valve 57 is closed.

Floating member 26 has an operative flexible connection with ring 25 by means of a leaf spring 58 which is fixed to said member by means of a bolt 59 seated in plate 29 and having its slotted end projecting outwardly and engaging said spring. The threaded end of bolt 59 receives washers 60 which are clamped against the spring by means of nuts 61. The ends of springs 58 are arranged on the opposite sides of pins 62, which latter are carried by ring 25.

Projecting outwardly from plate 29 are diametrically opposed blocks 64 having their sides, facing spring 58, curved and adapted to engage said spring when floating member 26 is partially rotated in ring 25. The curved sides of block 64 gradually engage spring 58 and serve to prevent the excessive rotating movement of floating member 26.

In the operation of the device shaft 14 is driven by pulley 13 causing crank pin 16 to travel in the direction indicated by the arrow. Crank pin 16 through the medium of block 28 and floating member 26 operates ring 25 so that pistons 24 are reciprocated and alternately enter pressure chambers 21 of the corresponding members 19. These chambers are completely filled with oil so that when one of the pistons 24 is forced into the respective oil chamber, the pressure created by the displaced oil acts on the corresponding secondary piston 38 causing it to move inwardly into a retracted position. Simultaneously with this action, suction is created in the opposite chamber by the withdrawal of the opposite piston 24 thereby permitting the corresponding secondary piston 38 to enter the upper end of the opposite pressure chamber 21. Secondary pistons 38 being connected to air pistons 37, it will be readily understood that pistons 37 are caused to operate in air compression chambers of cylinders 35 in unison with the actuation of pistons 38.

In order to prevent oil from being forced by the pressure in chambers 21 along piston 38 to air cylinders 35, each bushing 39 is

provided near its inner end with annular groove 65 with which is connected one end of a pipe 66 and the opposite end of said pipe is connected to the oil chamber 21 on the opposite side. Thus the surplus oil is caused to flow from groove 65 of the high pressure side through pipe 66 to the opposite or low pressure chamber 21. Check valve 67 is arranged in each pipe 66 near its point of connection with chamber 21 and prevents the back flow of oil through said pipe when the respective chamber 21 is under high pressure.

A pipe connection 68 extends from an annular groove 69 formed in the head of piston casing 34 and is connected at its lower end to the lower end of a vertically disposed pipe 70 which is connected near its lower end to oil chamber 20 by a pipe 71. A check valve 72 interposed in pipe 71 prevents the flow of oil from said chamber into pipe 70. Pipe connections 73 are connected at their upper ends to air cylinders 35 and their lower ends are connected to pipes 70 at points arranged above the level of oil in the outer oil chamber 20. Thus any oil which may have found its way in air cylinders 35 is drained through pipes 73 into pipes 70.

In order to prevent air from being conveyed to the chamber 20, pipes 73 are connected to pipes 70 above the level of oil in said chamber and the upper end of pipe 70 is open to the atmosphere preferably being closed by a perforated cap 74 so that any air entering through pipes 73 will be discharged through the open upper end of pipe 70. The lower ends of members 19 are closed by plugs 75 screw-seated therein and screw-lugs 76 close openings formed in the side walls of said members in alignment with pistons 24. Similar screw-plugs 77 close openings in the upper ends of members 19. Pistons 24 are provided in their outer ends with longitudinal bores 78, the inner ends of which, when said pistons occupy retracted positions, communicate with oil chamber 20. The outer end of each bore opens into the respective pressure chamber 21 and is normally or during the compression stroke of the piston closed by a spring-pressed ball 79 as shown in Figure 9. During the inward or expansion stroke of the piston, ball 79 is unseated and a limited amount of oil is permitted to pass from the oil chamber 20 to the respective pressure chamber 21. Thus pressure chambers 21 are automatically kept supplied with the proper amount of oil at all times.

The inner ends of bushings 18 terminate in oil chamber 20 and are slightly larger in diameter than pistons 24 so as to form a circular chamber 80. This chamber during the expansion stroke of the piston is filled with oil and upon the compression

stroke of said piston, an annular shoulder 81, formed on said piston, first closes the open end of said circular chamber, and then forces the oil contained therein through a bore 82 formed longitudinally in the inner end of said piston to the inner periphery of ring 25. The outer periphery of floating member 26 is provided with a circumferentially disposed groove or recess 83, the area of which is preferably equal to the area of piston 24 and the oil passes from bore 82 into said groove and lubricates the inner face of ring 25. A portion of the oil passes from recess 83 through a bore 84 to the concave faces of slot 27 and the bearing faces of block 28 which latter are provided with suitable recesses 85 for receiving the oil and are of substantially the same areas as the areas of pistons 24.

The surplus oil is collected in the inner chamber 32 and is partially discharged or thrown outwardly by the paddle 86 formed on the periphery of the rotating crank disk 15 into the outer oil chamber 20.

In the modified form shown in Figure 18 the oil pressure members 87 converge upwardly and formed integral with the upper ends thereof is an air cylinder casing 88 having air compression chambers 89 at its opposite ends, each of which is provided with suitable valve means 90. Operating in these chambers are pistons 91 to which are connected high pressure pistons 92. These high pressure pistons operate in high pressure chambers 93, the inner ends of which communicate with pressure chambers in members 87 and their outer ends terminate short of air chambers 89. Pistons 92 are interconnected by rod 94 and air compression chambers 89 are connected by a by-pass 95. Thus, when low pressure piston 96 enters the lower end of member 87, pressure is transmitted through the oil contained therein against the inner end of piston 92 in chamber 93 causing said piston to move outwardly thereby operating piston 91 of the air compression chamber 89. The compressed air is discharged through outlet pipe 97 while fresh air is admitted to the inlet pipe 98, both located in the head of each air compression chamber in which are also located valve means 90.

Figures 16 and 17 show the outer end of inlet pipe 47 provided with a scoop 47^a which terminates adjacent to the inner periphery of a rim 13^a of pulley 13. As the pulley revolves, the air is forced outwardly by the radial fan blades or spokes 13^b against the rim 13^a. This rim has formed integral therewith inwardly presented circular flanges 13^c and 13^d, respectively, which, together with rim 13^a form an air pocket and trap the air so that it readily enters the inlet pipe 47 through scoop 47^a.

The floating member 26 permits the

changing of the angular position of slot 27 whereby the speed of pistons 24 is retarded during the compression stroke in proportion with the increase in pressure or load encountered by the piston. The curved sides of blocks 64 are designed to cooperate with the springs 58 not only to prevent excessive rotative movement of member 26 but also to form a gradual substantially rigid operative connection between the feeding means and the piston carrying ring 25 after the slot 27 has assumed its extreme position.

The provision of two sets of hydraulic pistons, one set of which is operable by the hydraulic pressure created in the respective pressure chambers by the other or primary set, permits the secondary set to be of smaller cross section relative to the primary set so that said secondary pistons receive a longer stroke as compared with the primary pistons. This difference in the operating strokes of the primary and secondary pistons causes the air compression or low pressure pistons to have a comparatively long stroke and by virtue of the flexible connection between shaft 14 and ring 25, said air compressing pistons are operable at variable speed, the action of the pistons being retarded approximately during the last half of the compression stroke. The operation of pistons 24 whereby the latter alternately enter their respective chambers 21 produces undulating motion of the liquid contained therein, which motion or pressure acts upon secondary or long stroke pistons, causing the same to operate in unison with the primary pistons.

Oil passages 82 are designed to deliver oil to the bearing faces of the parts involved and serve to not only lubricate said bearing faces but also to transmit the pressure from pistons 24 to the oil contained in recesses 83 and 85 and through them the pressure is transmitted to the oil between the ring 25 and floating member 26 and block 28, which parts communicate with and are supplied with oil from the respective recesses. Thus the pressure is distributed to the various parts of the floating member and ring 26 by means of the oil and said operating parts are thereby relieved from undue strains which would result in uneven or excessive wear of the bearing faces of said parts.

I claim:

1. An air compressor comprising a primary piston, means for actuating said piston, operative connections in said means for automatically varying the speed of said piston during each stroke, a pressure chamber adapted to be wholly filled with liquid, said liquid being arranged to be placed under pressure by said piston, a secondary piston operating in said pressure chamber and adapted to be actuated by said liquid,

an air compression chamber, an air piston operating in said chamber and interconnected to said secondary piston, and valves for said air compression chamber.

2. In an air compressor, a rotatable member, a crank pin carried thereby, a bearing block for said pin, a ring, a reciprocating piston fixed thereto, and a floating member arranged in said ring and having a partial rotative movement relative thereto, said floating member being provided with an angularly disposed slot in which is slidably mounted said bearing block whereby the speed of the piston is varied by virtue of the partial rotary movement of said floating member.

3. In a device of the class described, a driving means, a crank pin operable thereby, a bearing block for said pin, a floating member having a diametrical slot formed therein, said slot being angularly disposed relative to said piston and adapted to slidably receive said bearing block, and a ring encircling said floating member and having secured thereto one end of said piston, said floating member being adapted to partially rotate under the pressure exerted upon it by said bearing block thus changing the angle of said slot and varying the speed of said piston.

4. In a device of the class described, a driving means, a crank pin operable thereby, a bearing block for said pin, a floating member having a diametrical slot formed therein, said slot being angularly disposed relative to said piston and adapted to slidably receive said bearing block, a ring encircling said floating member and having secured thereto one end of said piston, said floating member being adapted to partially rotate under the pressure exerted upon it by said bearing block thus changing the angle of said slot and varying the speed of said piston, and flexible operative connections between said ring and said floating member.

5. In a device of the class described, a driving means, a crank pin operable thereby, a bearing block for said pin, a floating member having a diametrical slot formed therein, said slot being angularly disposed relative to said piston and adapted to slidably receive said bearing block, a ring encircling said floating member and having secured thereto one end of said piston, said floating member being adapted to partially rotate under the pressure exerted upon it by said bearing block thus changing the angle of said slot and varying the speed of said piston, and resilient means operatively interposed between said ring and the floating member and adapted to restore the floating member to its normal position.

6. An air compressor comprising a pair

of fluid pressure chambers, means operable at variable speed for placing said chambers under pressure, a pair of oppositely disposed reciprocating pistons adapted to be operable by the fluid pressure created in said chambers, air compression chambers, pistons operating in said chambers and actuated by said fluid pressure pistons, and valve means for said air compression chambers.

7. An air compressor comprising a housing, a pair of tubular members adapted to contain liquid and connected at their lower ends to said housing, a pair of oppositely disposed pistons arranged in said housing and adapted to have their outer ends enter the respective tubular members, means in said housing for reciprocating said pistons, tubular casings fixed to the upper ends of said tubular members, interconnected pistons mounted in said casings and adapted to enter said tubular members and be actuated by the liquid displaced by the first mentioned pistons, air compression chambers located adjacent to said tubular casings, pistons operating in said cylinders and actuated by said liquid controlled pistons, and valve means arranged between the inner ends of said compression chambers.

8. An air compressor comprising a housing, a pair of tubular members adapted to be wholly filled with oil and connected at their lower ends to said housing, a pair of oppositely disposed primary pistons arranged in said housing adapted to have their outer ends enter the respective tubular members and displace the oil contained therein, means in said housing for reciprocating said pistons, tubular casings fixed to the upper ends of said tubular members, secondary pistons arranged in said casings, and operable by the displaced oil, air compression means actuated by said secondary pistons, and means in said primary pistons for admitting oil from said tubular members to said housing during the compression strokes of said pistons.

9. An air compressor comprising a housing, a pair of tubular members adapted to be wholly filled with oil and connected at their lower ends to said housing, a pair of oppositely disposed primary pistons arranged in said housing adapted to have their outer ends enter the respective tubular members and displace the oil contained therein, means in said housing for reciprocating said pistons, tubular casings fixed to the upper ends of said tubular members, secondary pistons arranged in said casings and operable by the displaced oil, air compression means actuated by said secondary pistons, means in said primary pistons for admitting oil from said tubular members to said housing during the compression strokes of said pis-

tons, and check valves in said means for closing the passage during the expansion strokes of the pistons.

10. An air compressor comprising a housing, a pair of tubular members connected at their lower ends to said housing and adapted to be wholly filled with oil, a pair of oppositely disposed primary pistons arranged in said housing and adapted to enter the respective tubular members and displace the oil contained therein, means in said housing for reciprocating said pistons, casings fixed to the upper ends of said tubular members, secondary pistons operating in said casings and designed to be actuated by the displaced oil, air compression means operated by said secondary pistons, each of said piston casings being provided with an annular inwardly presented groove encircling the piston, and a pipe connection leading from each of said annular grooves to the tubular member on the opposite side whereby oil which enters said casing from the respective tubular member when the latter is under high pressure is collected in said groove and conveyed by said pipe connection to the opposite or low pressure tubular member.

11. An air compressor comprising a housing, a pair of tubular members connected at their lower ends to said housing and designed to be wholly filled with oil, a pair of oppositely disposed primary pistons arranged in said housing and adapted to have their outer ends enter said tubular members and displace the oil contained therein, means in said housing for reciprocating said pistons, tubular casings fixed to the upper ends of said tubular members, secondary pistons mounted in said casings and adapted to enter said tubular members and be actuated by the displaced oil, air compression cylinders, pistons arranged in said cylinders and operable by said secondary pistons, valve means arranged between the inner ends of said air compression cylinders, and a pipe connection between the outer or dead end of each cylinder and said housing for returning the oil from the cylinder to the oil chamber in said housing.

12. An air compressor comprising a housing, a pair of tubular members connected at their lower ends to said housing and designed to be wholly filled with oil, a pair of oppositely disposed primary pistons arranged in said housing and adapted to have their outer ends enter said tubular members and displace the oil contained therein, means in said housing for reciprocating said pistons, tubular casings fixed to the upper ends of said tubular members, secondary pistons mounted in said casings and adapted to enter said tubular members and be actuated by the displaced oil, air compression cylinders, pistons arranged in said cylinders and

operable by said secondary pistons, valve means arranged between the inner ends of said air compression cylinders, a pipe connection between the outer or dead end of each cylinder and said housing for returning the oil from the cylinder to the oil chamber in said housing, and a by-pass connection between the outer ends of said air compression cylinders.

13. An air compressor comprising a housing, a pair of tubular members connected at their lower ends to said housing and designed to be wholly filled with oil, a pair of oppositely disposed primary pistons arranged in said housing and adapted to have their outer ends enter said tubular members and displace the oil contained therein, means in said housing for reciprocating said pistons, tubular casings fixed to the upper ends of said tubular members, secondary pistons mounted in said casings and adapted to enter said tubular members and be actuated by the displaced oil, air compression cylinders, pistons arranged in said cylinders and operable by said secondary pistons, valve means arranged between the inner ends of said air compression cylinders, and a pipe connection connected to each piston casing at a point immediately adjacent to the air cylinder and connected to said housing at a point below the level of the oil contained therein.

14. An air compressor comprising a housing, a pair of tubular members connected at their lower ends to said housing and designed to be wholly filled with oil, a pair of oppositely disposed primary pistons arranged in said housing and adapted to have their outer ends enter said tubular members and displace the oil contained therein, means in said housing for reciprocating said pistons, tubular casings fixed to the upper ends of said tubular members, secondary pistons mounted in said casings and adapted to enter said tubular members and be actuated by the displaced oil, air compression cylinders, pistons arranged in said cylinders and operable by said secondary pistons, valve means arranged between the inner ends of said air compression cylinders, and a manually controlled by-pass connection between the upper ends of said tubular members.

15. In an air compressor, a revoluble member, a crank pin carried thereby, a circular floating member provided with an angularly disposed slot, a block slidably arranged in said slot and forming a bearing for said crank pin, a ring loosely arranged on said floating member, and reciprocating pistons carried by said ring.

16. An air compressor comprising driving means, a primary piston, a flexible operative connection therebetween for retarding the speed of said piston, a pressure chamber wholly filled with liquid and having the

compression end of said piston operating therein whereby the liquid contained therein receives undulating motion, a secondary piston in communication with said pressure chamber and adapted to be actuated by the undulating pressure created in said chamber by said liquid, and air compressing means operable by said secondary piston.

17. In an air compressor, a housing provided with an oil chamber, actuating means, a ring arranged in said housing, a floating member movably mounted in said ring and having an angularly disposed slot, a block connected to said driving means and slidably arranged in said slot, a piston arranged on said ring and provided with a longitudinally disposed bore, one end of which communicates with suitable recesses formed in the bearing faces of said floating member and said block, and a bearing for said piston and having a tubular extension with which the opposite end of said bore is adapted to communicate, said tubular extension being adapted to receive oil which is then discharged therefrom under pressure through

said bore to said oil recesses, thereby placing the oil contained between the bearing faces of said ring and said floating member and the block under pressure.

18. In an air compressor, the combination with the inlet port thereof, of a rotating wheel, an inlet pipe connected at one end to said inlet port and having its opposite end terminating adjacent to the inner periphery of said wheel whereby the air impinging on said ring is drawn into said inlet pipe.

19. In an air compressor, the combination with the inlet port thereof, of a fly wheel, an inlet pipe connected to said inlet port and terminating adjacent to said wheel, a scoop arranged on the end of said inlet pipe and radially disposed relative to the inner periphery of said fly wheel, said fly wheel being provided with inwardly presented circular flanges whereby the air centrifugally forced against said ring is forced through said scoop into said inlet pipe.

In testimony whereof I hereunto affix my signature this 13th day of July, 1922.

JOHN O. CARREY.