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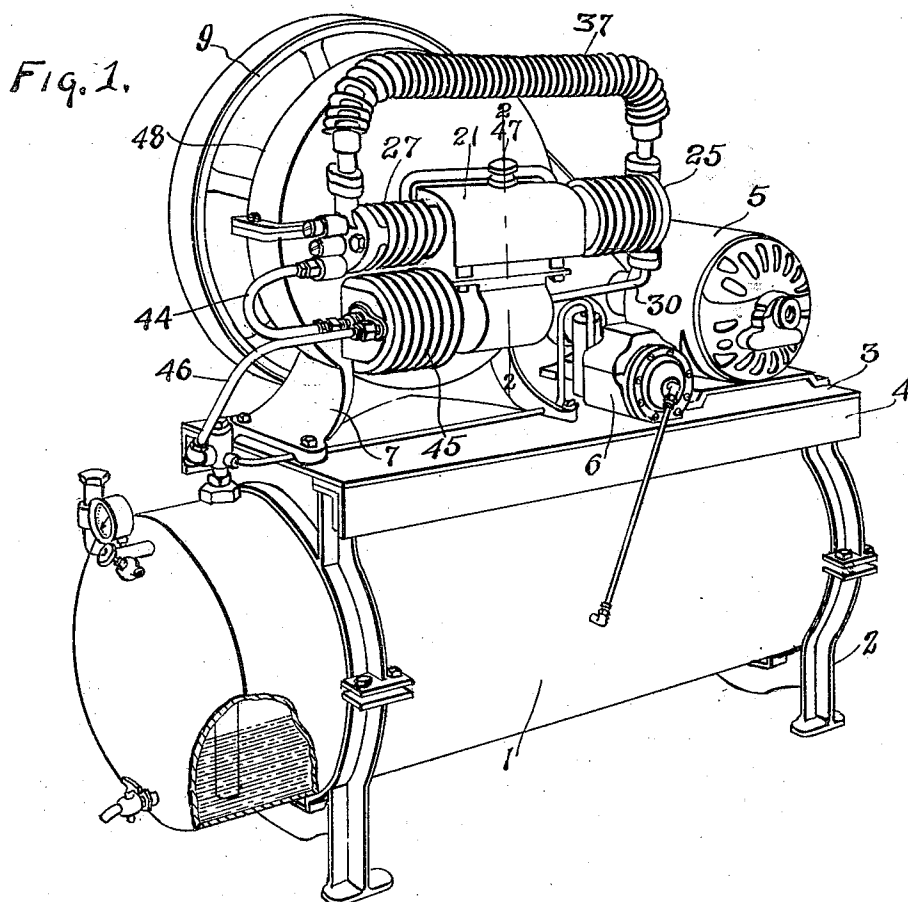
1,503,540

J. W. LAWHEAD

AIR COMPRESSOR

Filed Nov. 20, 1922

4 Sheets-Sheet 1



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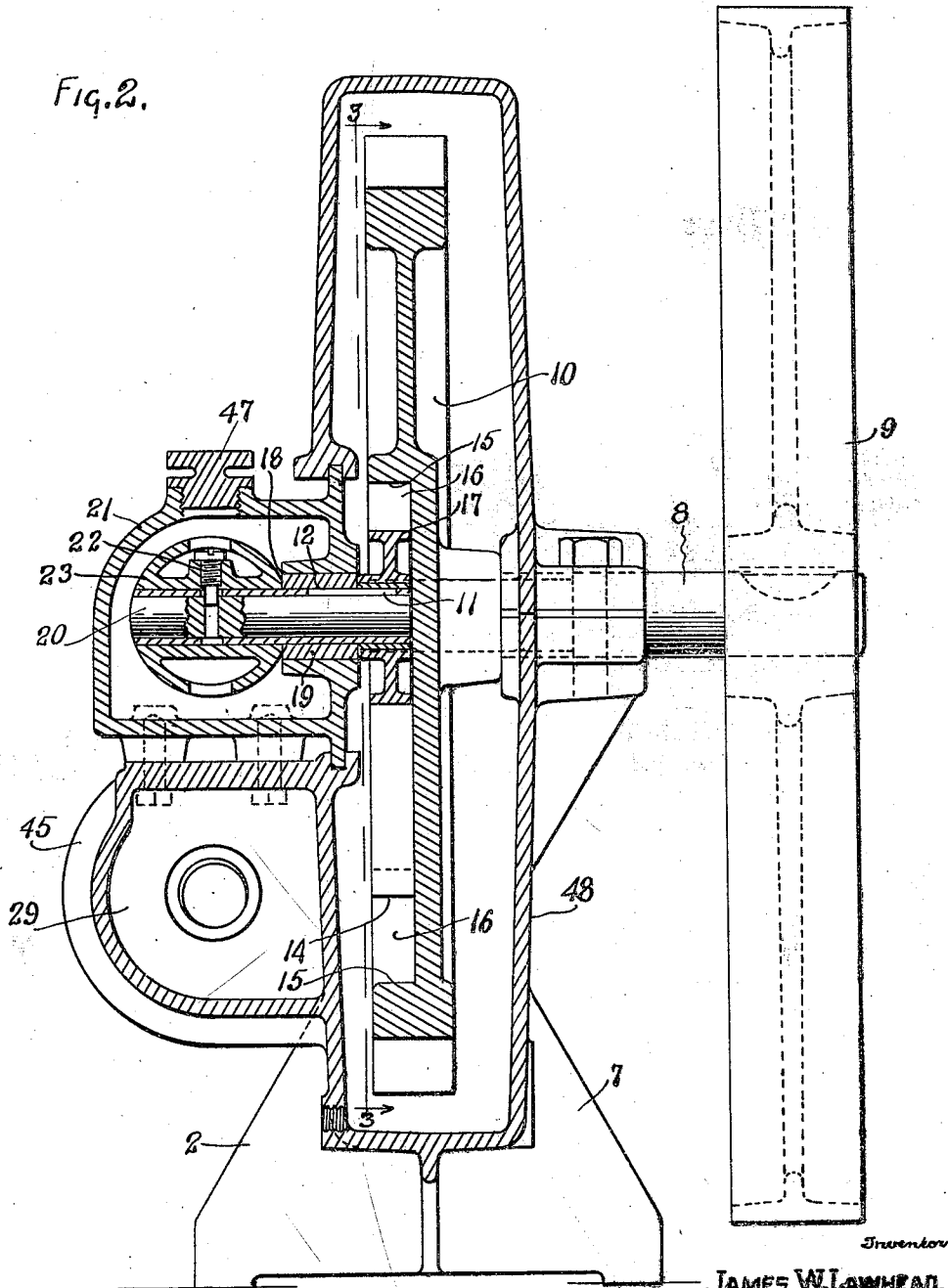
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Fig. 2.



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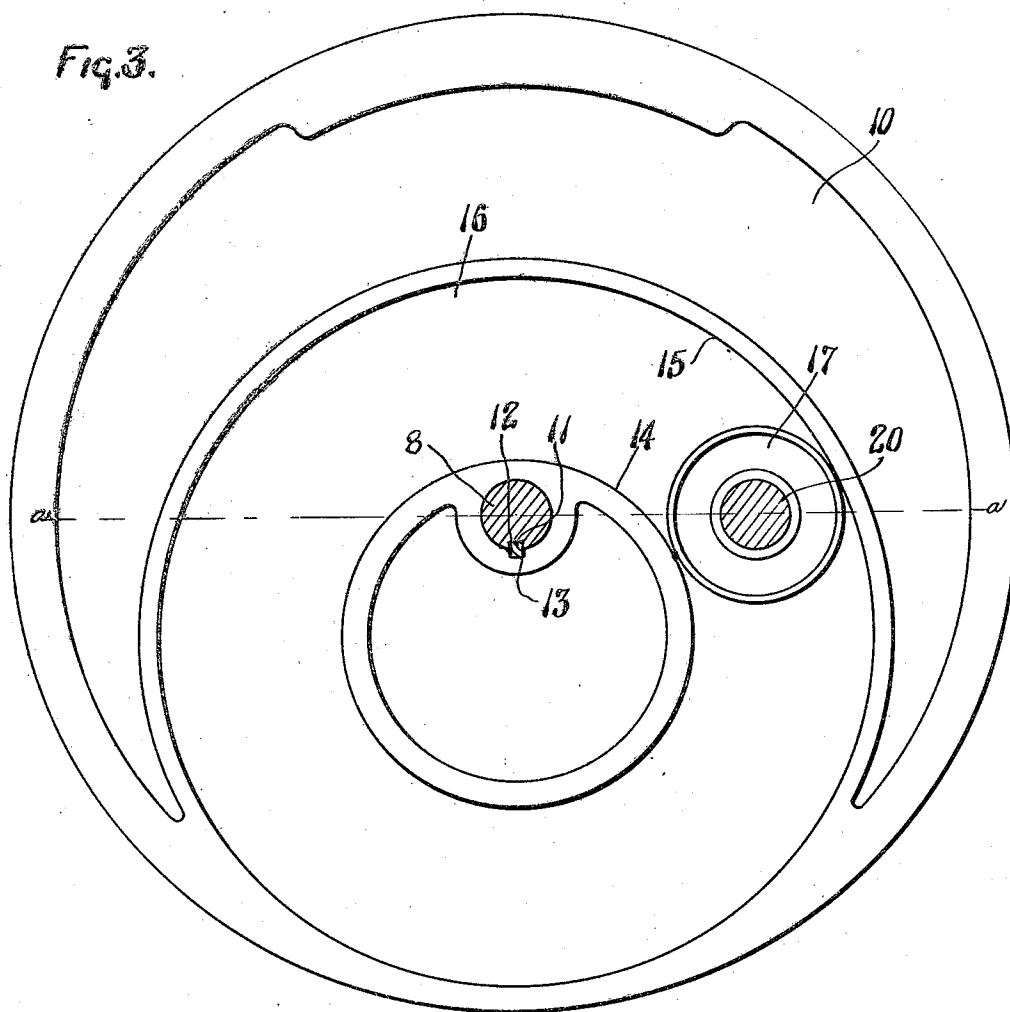
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Fig. 3.



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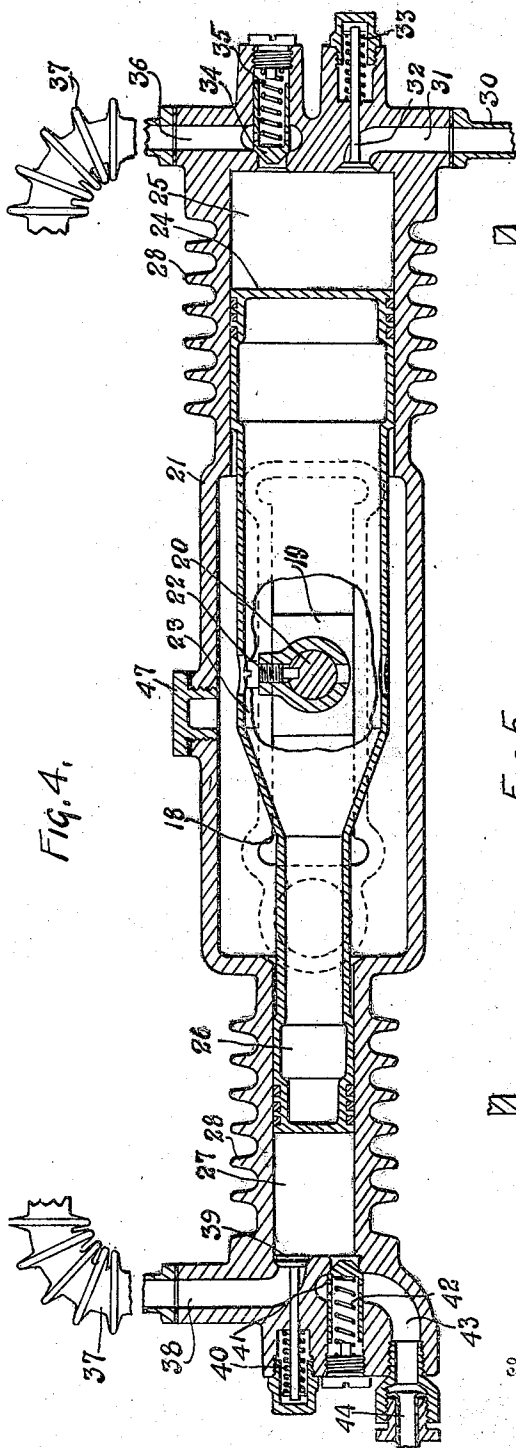
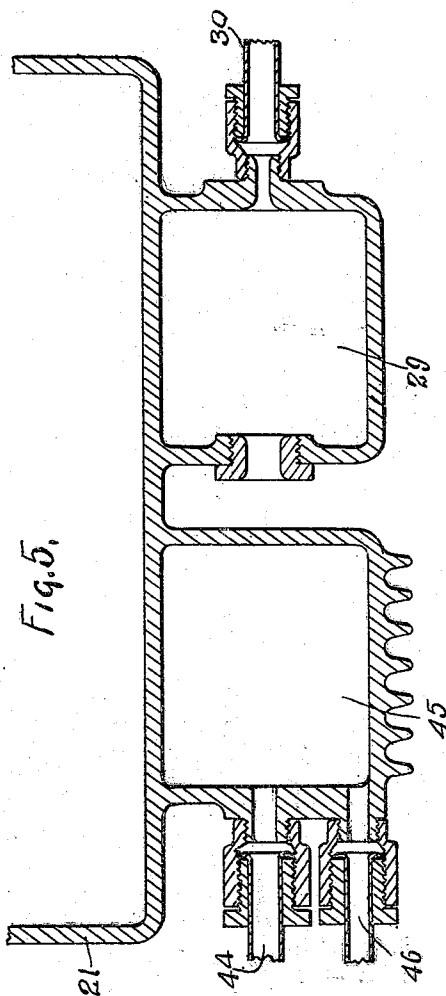
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AIR COMPRESSOR

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

JAMES W. LAWHEAD, OF WILMINGTON, OHIO, ASSIGNOR TO THE AU-TO COMPRESSOR COMPANY, OF WILMINGTON, OHIO, A CORPORATION OF OHIO.

AIR COMPRESSOR.

Application filed November 20, 1922. Serial No. 602,041.

To all whom it may concern:

Be it known that I, JAMES W. LAWHEAD, a citizen of the United States, residing at Wilmington, in the county of Clinton and State of Ohio, have invented certain new and useful Improvements in Air Compressors, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to air compressors and in particular to driving mechanism therefor.

It is the object of my invention to provide the advantages of a rotary driving element whose axis of rotation is maintained substantially at right angles to the axial line of the reciprocating piston.

It is my object to provide means to interconnect a piston of this character and such a rotary driving member which will accomplish two results, to wit, the function of conveying to the piston a right line motion and the function of preventing the piston from rotary motion on its own axis.

It is my object to provide a driving mechanism which will develop a large proportion of the horse power applied to it, will not readily wear and will positively and rapidly impart reciprocatory movement from a rotary body.

It is my object to provide such other coordinate objects which may be found necessary of accomplishment in an air compressor.

Referring to the drawings:

Figure 1 is a perspective of my complete outfit embodying my invention;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is a section through the primary and secondary cylinders and pistons showing the valve arrangement;

Fig. 5 is a section through the introductory and exit chambers.

Referring to the drawings in detail:

1 is a tank supported upon the rings 2. Upon the tank is mounted a base plate 3 on the side members 4. This base plate carries the power unit 5, the regulator 6 and the compressor support 7. This compressor support 7 supports the main driving shaft 8 and the power wheel or driving wheel 9 which is mounted thereon.

At the other end of 8 opposite the end on which the driving wheel 9 is located is the cam 10. 10 is mounted on 8 and retained thereon by a key 11 working in the keyway 12, in the shaft 8, and in the keyway 13 in the cam wheel 10. The cam rings 14 and 15 form a channel-way therebetween designated 16 forming a guide-way or track. These two cam rings are concentric with one another. The shaft 8 is located near the rim of the inner ring 14. Both rings are eccentrically located with respect to the shaft 8 which is centrally located of the cam wheel and the first and the outer ring 13 merges at one point in its length with the periphery and the cam wheel 10.

Located between these cam walls 14 and 15 and adapted to travel eccentrically of the shaft 8 as well as turn about its own axis is the cam anti-friction roller 17 which is rotated about its own axis as 10 rotates and is also bodily reciprocated along the line designated *a—*a** a distance limited by the dimensions of the several parts as will be seen indicated by the guide-way 18 formed in the housing. 18 serves as the guide-way for a guide-block 19 which carries with it the non-rotating piston rod 20 which reciprocates back and forth on the line *a—*a** with the bodily movement of 17. 17 rotates freely upon the piston rod 20. This rod 20 projects through the guide-block 19 and into the cylinder casing 21 where it is joined by the set screw 22 to the piston frame 23.

This frame carries a piston head 24 which works in the primary compression chamber 25. It also carries a piston head 26 working in the secondary or high compression chamber 27. Each of these chambers is provided with radiating fins to radiate the heat therefrom.

In operation, the air is drawn from the chamber 29 through the pipe 30, the in-take passageway 31 beneath the valve 32 against the resistance of the valve spring 33 into the primary or low compression cylinder 25.

Upon being compressed the air makes its exit by depressing the exit valve 34 against the resistance of the spring 35, and makes its exit through the heat radiating passageway 36, through 37 to the in-take passageway 38 adjacent the high compression cylinder 27. It makes its entrance into the cylinder by elevating the valve 39 against the spring 40. Upon being compressed to a

predetermined degree which depresses the exit valve 41 against the resistance of the spring 42. It then makes its escape through the passageway 43 and the pipe 44 to the chamber 45, whence it passes through the pipe 46 to the tank 1.

The casing 21 is provided with a removable cap 47 to permit of inspection in oiling.

It will also be seen that the inclosing casing 48 will permit of oil being placed in the bottom thereof to keep the cam wheel lubricated as well as the cam rings.

It will be understood that I desire to comprehend within my invention the suitable and necessary modifications which may be found necessary in adapting it to varying types of machinery. It will be further understood that I prefer to use it in connection with an air compressor, but do not desire to limit myself to such an adaption of it.

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

1. The combination with a cylinder casing having a slot in one side wall, the edges of said slot constituting guides for a guide block, of a guide block mounted in said guides to reciprocate longitudinally of said casing, a housing portion adjacent the casing and having an oil sump therein, a piston reciprocably mounted in said casing, a pin secured to said piston and passing through the guide block to project therefrom, and a rotating cam mounted in said housing and extending into said sump and having a groove wherein said pin engages.

2. The combination with a housing having an opening in a wall thereof and an oil sump therein, a cylinder casing having a portion thereof closing the opening in said housing and a slot in said portion, the edges of said slot constituting guides for a guide block, of a guide block mounted in said guides to reciprocate longitudinally of said casing, a piston reciprocably mounted in said casing, a pin secured to said piston and passing through the guide block, to project therefrom into said housing, a rotating cam

mounted on said housing and extending into said sump and having a groove wherein said pin engages, alined cylinders at the opposite ends of said casing, heads on said piston fitting respective cylinders, and means for rotating said cam.

3. The combination with a cylinder casing having a slot in one side and a centrally disposed opening in its top, the edges of said slot constituting guides, a removable closure for said opening, of a guide block mounted in said guides to reciprocate longitudinally of said casing, a hollow piston reciprocably mounted in said casing and provided with a transversely extending pin bearing having a threaded set screw bore movable into and out of alinement with the casing opening, a pin having one end mounted in said bearing and extending through said guide block to project therebeyond, a set screw in said bore engaging said pin, a cam roller on the projecting end of said pin, and a rotating cam engaging said cam roller.

4. The combination with a cylinder casing having a slot in one side and a centrally disposed opening in its top, the edges of said slot constituting guides, a removable closure for said opening, of a guide block mounted in said guides to reciprocate longitudinally of said casing, a hollow piston reciprocably mounted in said casing and provided with a transversely extending pin bearing having a threaded set screw bore movable into and out of alinement with the casing opening, a pin having one end mounted in said bearing and extending through said guide block to project therebeyond, a set screw in said bore engaging said pin, a cam roller on the projecting end of said pin, a rotating cam engaging said cam roller, alined cylinders at the opposite ends of said casing, and heads on said piston fitting respective cylinders.

In testimony whereof I affix my signature.

JAMES W. LAWHEAD.