

C. E. SHADALL.
MOTOR AND COMPRESSOR.
APPLICATION FILED AUG. 24, 1908.

1,012,725.

Patented Dec. 26, 1911.

2 SHEETS-SHEET 1.

Fig. 1.

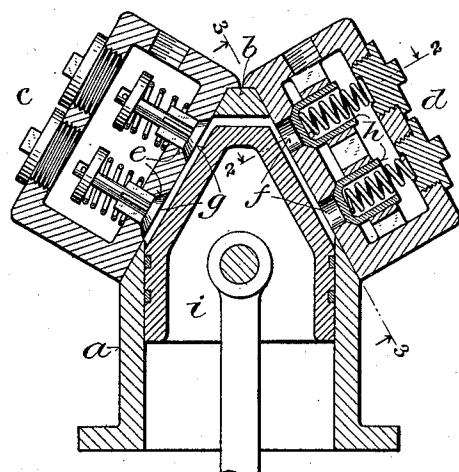


Fig. 2.

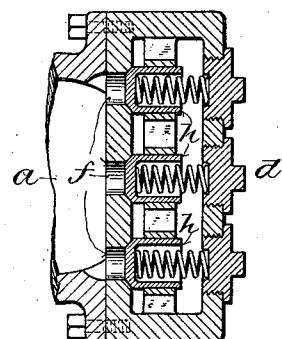


Fig. 4.

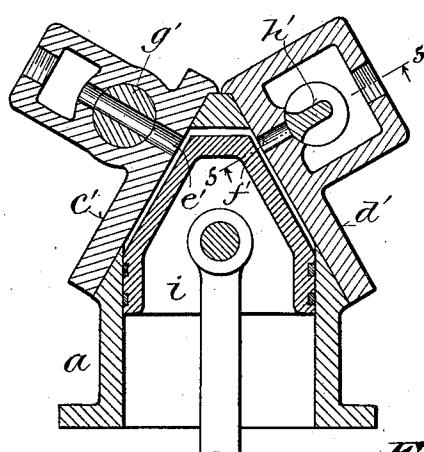
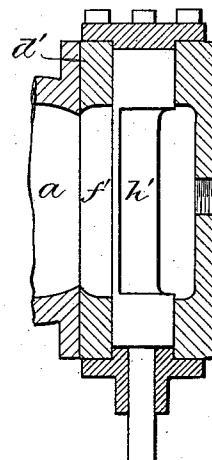


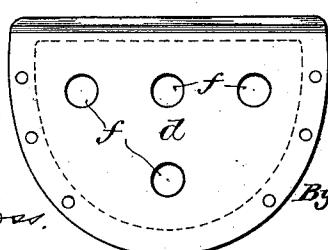
Fig. 3.



Witnesses:

Ted Palm

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2 SHEETS—SHEET 2.

Fig. 6.

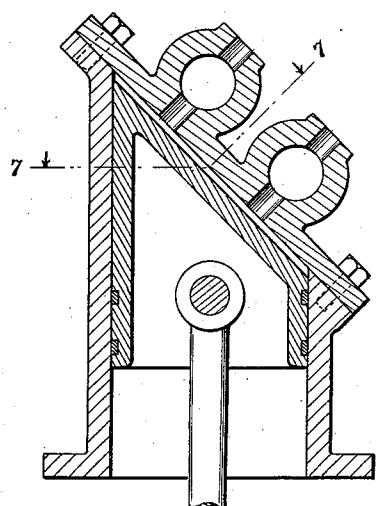
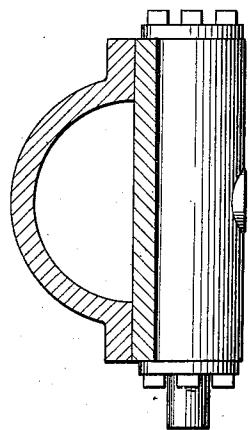


Fig. 7.



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UNITED STATES PATENT OFFICE.

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MOTOR AND COMPRESSOR.

1,012,725.

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Application filed August 24, 1908. Serial No. 449,946.

To all whom it may concern:

Be it known that I, CHARLES E. SHADALL, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Motors and Compressors, of which the following is a specification, reference being had to the accompanying drawing, forming a part

10 thereof.

The main object of this invention is to increase the available area for valves and ports at one or both ends of the cylinder without increasing the clearance space.

15 It consists in certain novel features of construction and in the peculiar arrangement and combinations of parts as herein-after particularly described and pointed out in the claims.

20 In the accompanying drawing like characters designate the same parts in the several figures.

Figure 1 is an axial section of a single-acting compressor embodying the invention; Fig. 2 is a section on the line 2 2, Fig. 1, of one of the oblique cylinder heads and valve chambers; Fig. 3 is an inside view as indicated by the dotted line 3 3, Fig. 1, of one of the cylinder heads; Fig. 4 is a view like Fig. 1, of a single-acting compressor or motor embodying the invention, but provided with rotative or oscillatory valves of the Corliss type, in place of the automatic valves shown in Figs. 1 and 2; Fig. 5 is a section of one of the oblique cylinder heads and valve chambers on the line 5 5, Fig. 4; Fig. 6 is an axial section similar to Figs. 1 and 4, showing a motor or compressor embodying the invention in a modified form; and Fig. 7 is a section on the line 7 7, Fig. 6.

Referring to Figs. 1, 2 and 3, *a* designates a single-acting compressor cylinder, cut at one end in planes at oblique angles to the axis of the cylinder and formed or provided in the present case adjacent to the intersection of said oblique planes with a bridge or cross piece *b*. *c* and *d* designate the cylinder heads, which are fitted and bolted or otherwise secured to the oblique faces of the cylinder, and are formed with inlet or suction ports *e*, and outlet or discharge ports *f* respectively. In the present illustration these cylinder heads are

shown as forming the valve chambers or cases, and are provided with inlet or suction valves *g*, and outlet or discharge valves *h* of the automatic puppet type. The oblique cylinder heads may be cast or formed together in one piece, but are preferably separate as shown, to facilitate making and finishing them. They are accurately planed or finished on their port faces to fit the oblique faces of the cylinder, the bridge or cross piece *b* serving as a support therefor at the apex of the cylinder. A trunk piston *i*, fitted in the cylinder *a*, is cut at its working end, as shown in Fig. 1, in planes parallel with the oblique faces of the cylinder to which the ported heads are applied. By thus cutting the cylinder and piston at either or each end in one or more planes oblique to the axis of the cylinder, the available area for valves and ports is materially increased for a cylinder of a given diameter without enlarging the clearance space, the oblique plane faces of the piston being parallel and corresponding with the inner oblique faces of the cylinder heads to which they can closely approach.

Referring to Figs. 4 and 5, showing a single-acting motor or compressor cylinder and piston of like or similar construction the oblique heads *c'* and *d'* are formed with transversely extended or oblong ports *e'* and *f'*, and provided with rotative or oscillatory valves *g'* and *h'* of the Corliss type, which are positively actuated in the usual manner, in place of the automatic puppet valves shown in Figs. 1 and 2. Instead of cutting the cylinder and piston at either or each end in two oblique planes, they may be cut in a single plane oblique to the axis, as shown in Figs. 6 and 7, in which both the inlet and outlet ports and valves are formed and mounted in the same head, which affords greater area therefor than the ordinary head arranged in a plane at right angles to the axis of the cylinder.

Various modifications in details of construction may be made in adapting the invention to motors and compressors of different types having valves of different kinds, without departing from the essential principle of the invention.

I claim:

1. The combination of a cylinder having the portion in which the piston works cut

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5 at one end in a plane at an oblique angle to the axis of the cylinder and having an oblique plane faced head fitted to the obliquely cut end of the cylinder and provided with a port, and a piston cut at one end in a plane parallel with the inner oblique plane face of said cylinder head, substantially as described.

10 2. The combination of a cylinder and piston cut at one end in parallel planes at an oblique angle to their axis, and an oblique plane faced cylinder head fitted to the obliquely cut end of the cylinder and provided with a plurality of valve ports and 15 valves, the obliquely cut portion of the cylinder receiving the obliquely cut portion of the piston, substantially as described.

20 3. The combination of a cylinder having the portion in which its piston works cut at one end in planes oblique to its axis and having oblique plane faced heads fitted to the obliquely cut end of the cylinder and provided with ports, and a piston cut at one end in planes parallel with the inner 25 oblique plane faces of the cylinder heads, substantially as described.

25 4. The combination of a cylinder having the portion in which its piston works cut at one end in planes oblique to its axis and having a cross piece adjacent to the intersection of said planes, separate plane faced cylinder heads fitted to the obliquely

cut end of the cylinder and provided with ports, and a piston cut at one end in planes parallel with the inner faces of the oblique 35 cylinder heads, substantially as described.

5. The combination of a cylinder having the portion in which its piston works cut at one end in a plane oblique to its axis, a plane faced chambered head fitted to the 40 oblique end face of the cylinder and provided with a port and valve, and a piston fitted in said cylinder and cut at one end in a plane parallel with the oblique inner 45 plane face of the cylinder head, substantially as described.

6. The combination of a cylinder having the portion in which its piston works cut at one end in planes oblique to its axis, plane faced chambered heads fitted to the 50 oblique faces of the cylinder and formed with ports in the oblique walls next to the cylinder, valves inclosed in said heads and seated in said ports, and a piston fitted in said cylinder and cut at one end in oblique 55 planes parallel with the inner plane faces of the cylinder heads, substantially as described.

In witness whereof I hereto affix my signature in presence of two witnesses.

CHARLES E. SHADALL.

Witnesses:

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EMMA GOETZ.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."