Sept. 14, 1926. 1,599,414

L. R. HUFF

COMPRESSOR VALVE

Filed Jan. 29, 1926 2 Sheets-Sheet 2

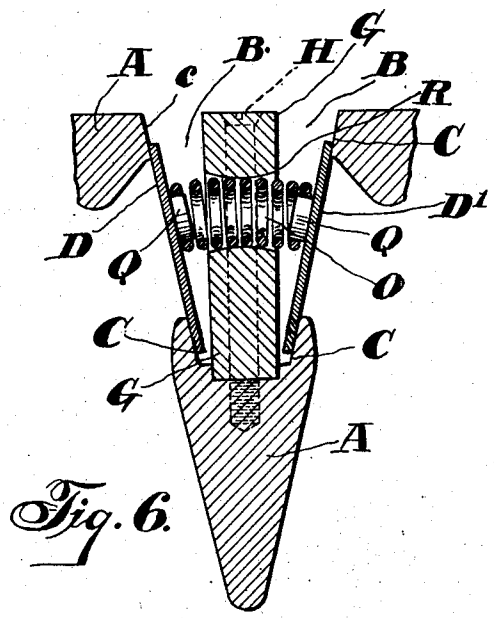

Fig. 6.

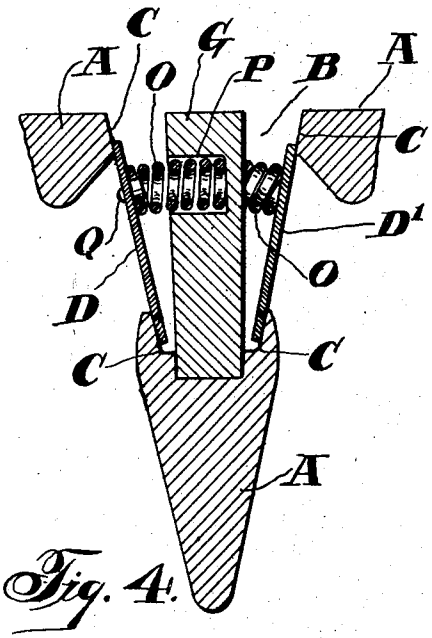

Fig. 4.

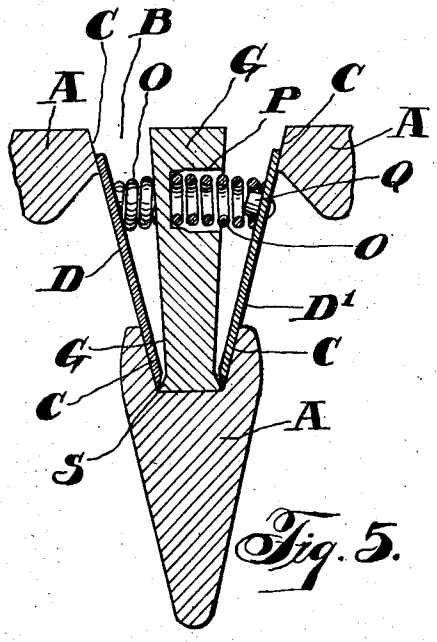

Fig. 5.

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COMPRESSOR VALVE

Filed Jan. 29, 1926 2 Sheets-Sheet 1

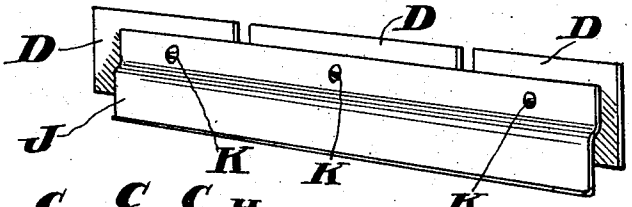

Fig. 3.

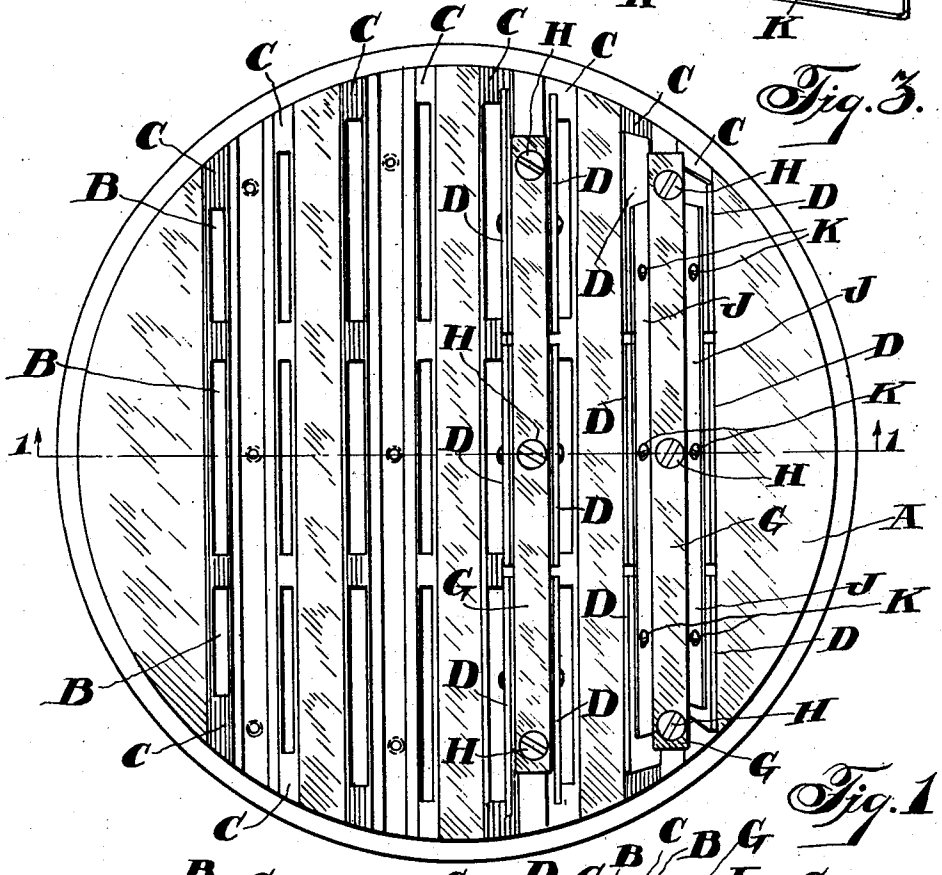

Fig. 1.

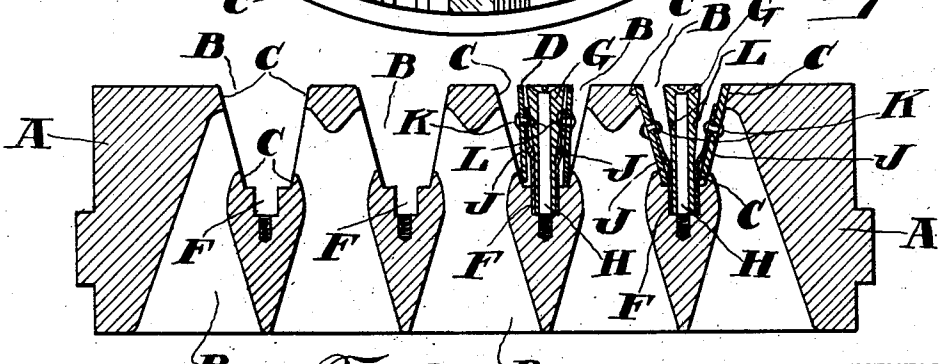

Fig. 2.

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UNITED STATES PATENT OFFICE.

LESLIE R. HUFF, OF PHILLIPSBURG, NEW JERSEY, ASSIGNOR TO INGERSOLL-RAND COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

COMPRESSOR VALVE.

Application filed January 29, 1926. Serial No. 84,653.

This invention relates to compressors but more particularly to improvements in the design of plate valves for compressors whereby a direct flow can be secured through the ports of the valve while, at the same time, all the other desirable features of the plate valve are retained.

The objects of my invention are primarily to obtain the maximum of opening for the passage of fluid through a valve of this type, and to avoid abrupt deflections of the fluid, thus obtaining a straighter flow and less velocity and pressure drop.

Further objects of my invention will hereinafter appear and to all of these ends the invention consists of the preferred constructions illustrated in the accompanying drawings, in which

Figure 1 is a top plan view of a plate valve assembly embodying the elements of my invention,

Figure 2 is a transverse cross sectional view of the same valve assembly taken along the lines 1—1 in Figure 1,

Figure 3 is a detailed perspective view of a valve plate and the form of valve spring guide arm shown in Figure 2, and

Figures 4, 5 and 6 are enlarged detailed transverse sectional views broken away showing modifications of the assembly shown in Figure 1 in which coil springs are substituted for spring arms.

Referring to the drawings, A represents a valve seat preferably circular in form and provided with a fluid passageway B. The valve seat is formed with the flat seating surfaces C inclined at an angle to the longitudinal axis of the valve and a rigid valve plate D preferably rectangular in form is adapted to be seated on said inclined surfaces C over the passageway B. A slot F is cut in the bottom of the groove formed by the inclined seating surfaces C and a stop G forming a partition wall is adapted to fit within this slot and to be held there fixedly by means of the screws H. The sides of the stops G are cut so that they will be approximately perpendicular to the valve seat and they are adapted to be used as back stops for the valve plates D.

The valve plates D are held in proper relation to the inclined seating surfaces C by means of spring arms J which are attached at one end to the valve plates by the rivets K and which are inserted at the other end in the slots F and are held there by means of the stops G. These spring arms J are adapted to normally hold the valve plate against its seat but when pressure is built up in the cylinder forcing the valve open, they will guide the valve plates back against the stops and generally perform the functions of a valve guide.

Indentations L are made in the stop plate to receive the heads of the rivets K and thus allow the valve plate when open to lie flush against its stop H. When this is done, it will be seen that an unbroken line of flow is offered through the ports B in the valve seat. As is shown in Figures 1 and 2 the stops G have been seated in slots F at the bottoms of the grooves in the valve seat. This is a preferred means for affixing them to the valve seat but any other satisfactory method could be employed.

Figure 4 is a modification of my invention in which the spring clip or arm for guiding the valve plate is dispensed with, and a coil spring O is used. Recesses P are cut alternately on each side of the stop G opposite the two valve plates D and D', while buttons or raised cylindrical portions Q are formed on the valve plate at a point opposite to the recesses P in the stop G, allowing coil springs O to be placed in the recesses P and to engage the buttons Q, thereby normally holding the valve plate in a fixed relation to and upon the valve seating surfaces C.

Figure 5 is a further modification of my invention in which the valve plate D is allowed to rest in the bottom of the groove formed by the inclined seating surfaces and is provided with a fulcrum S upon which it is adapted to rock between the seating surfaces C and the back stop G while the coil spring O is applied to the device in any preferred manner.

In Figure 6 cylindrical bores R have been drilled through the partition wall or back stop G and one coil spring is used to exert pressure on the valve plates D and D' located on each side of the said back stop, the said spring being located in the bore intermediate of the two valve plates and bearing upon each with equal pressure.

I am not to be understood as limiting myself to the exact and precise details shown in the drawings or described in the specification but what I claim are the general im-

provements in the design of the type of valve described, which can be modified in many ways by one skilled in the art in order to comply with special conditions of manufacture or operation.

I claim:

1. A plate valve comprising a valve seat having passageways, grooves in said valve seat having diverging sides forming inclined surfaces over said passages, rectangular stops attached rigidly to the valve seat at the bottom of said grooves and perpendicular to the said valve seat, recesses in the sides of said stops and coil springs in said recesses adapted to bear upon said valve plates at right angles thereto and to hold them upon their seats.

2. A plate valve comprising a valve seat having passageways, grooves in said valve seat having diverging sides forming inclined flat seating surfaces, rigid valve plates adapted to be seated on said inclined surfaces over said passageways, slots in the bottom of said grooves, stops held in said slots by screw means perpendicular to the valve seat, recesses in said stops, and coil springs adapted to be held in said recesses and to bear upon the said valve plates at right angles thereto for normally holding the valve plates upon their seats.

3. A plate valve comprising a valve seat having passageways, grooves in said valve seat having diverging sides forming inclined flat seating surfaces, stops between the said inclined seating surfaces, valve plates adapted to be seated on said inclined surfaces over said passageways and to rest upon the bottoms of said grooves between the said inclined surfaces and the stops, recesses in the said stops and coil springs in said recesses adapted to bear upon the said valve plates at right angles thereto to normally hold the valve plates upon their seats.

4. A plate valve comprising a valve seat having passageways, grooves in said valve seat having diverging sides forming inclined flat seating surfaces, slots in the bottoms of the grooves, rigid valve plates adapted to seat on said inclined surfaces over the passageways, stops to be held in said slots by screw means perpendicular to the valve seat, recesses in said stops, buttons or relieved cylindrical portions on said valve plates opposite and adjacent to the said recesses in said stops, coil springs adapted to lie in the said recesses and to fit over the said buttons for holding the said valve plates in proper relation to the said inclined seating surfaces.

In testimony whereof I have signed this specification.

LESLIE R. HUFF.