

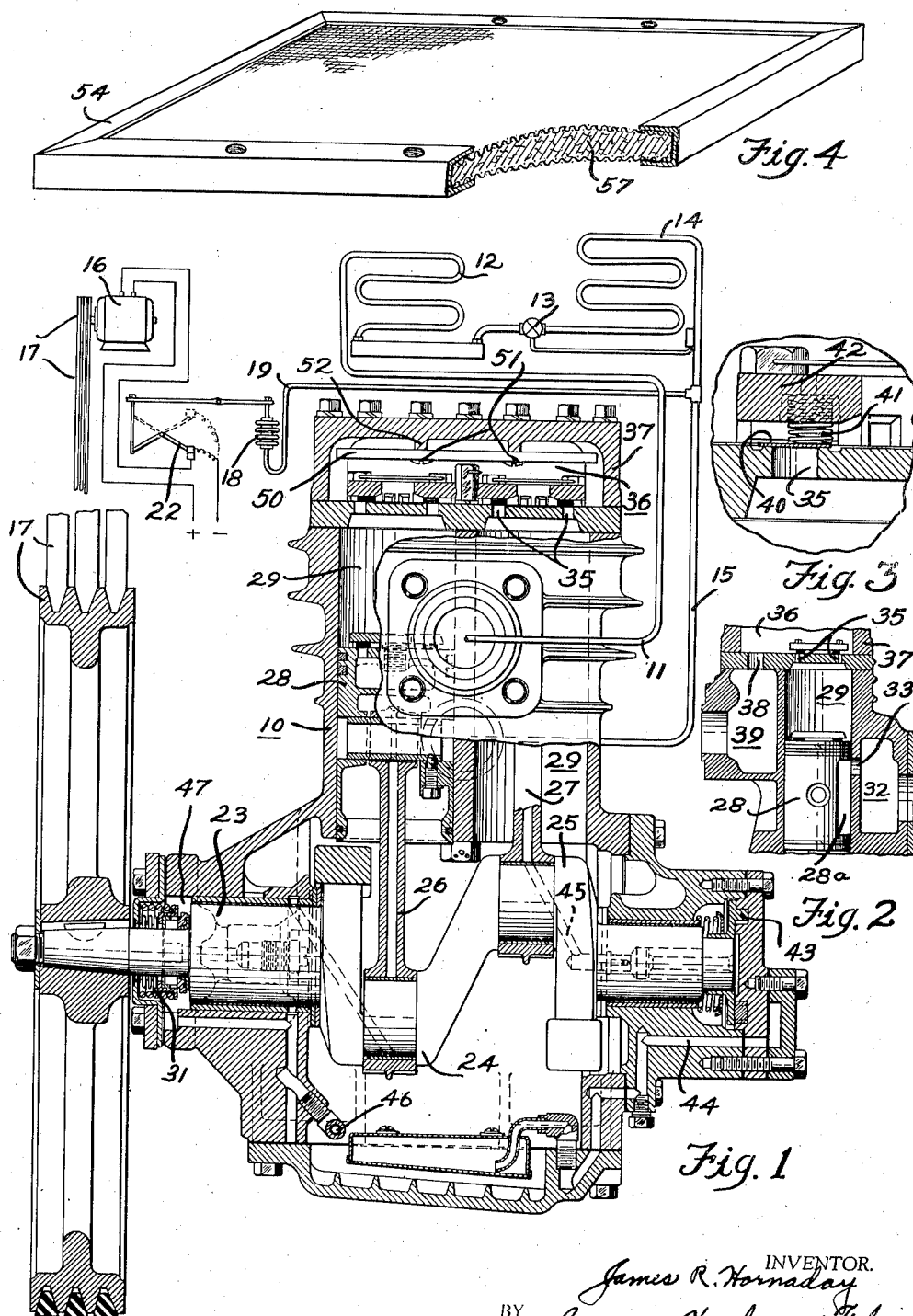
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REFRIGERATING APPARATUS

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REFRIGERATING APPARATUS

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This invention relates to refrigeration and more particularly to an improved compressor mechanism.

An object of this invention is to provide a compressor which is efficient and silent in operation.

One of the big problems in designing a compressor is that of eliminating noises. Inasmuch as a large share of the noise is caused by the discharge valves and the fluid flowing through the discharge ports, efforts have been made to muffle the noises by providing a plurality of chambers into which the discharged medium is circulated, but in so doing the efficiency of the compressor is of necessity reduced. Other efforts have been made to silence the compressors by enclosing the cylinder head in sound deadening material such as sponge rubber, but in so doing the operating temperatures of the compressor are materially increased with the result of inefficient operation of the compressor.

An object of applicant's invention, therefore, is to provide means for silencing a compressor which neither interferes with the flow of refrigerant from the compressor nor interferes with the dissipation of heat from the cylinder and cylinder head.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing, wherein a preferred form of the present invention is clearly shown.

In the drawing:

Fig. 1 is an elevational view partly in cross section of a compressor provided with applicant's sound deadening means;

Fig. 2 is a fragmentary cross-sectional view on a reduced scale through one cylinder taken at right angles to the showing in Fig. 1;

Fig. 3 is a fragmentary sectional view showing the discharge valve construction; and

Fig. 4 is a perspective view of the sound deadening baffle with a portion broken away.

Referring to the drawing for illustrating the present invention, I have shown a refrigerating system of the type suitable for installation in localities where noise caused thereby will be objectionable. Apparatus of this type must be automatic in operation and such operation thereof must be carried out quietly. The apparatus or system may comprise a compressor, generally represented by a reference character 10, discharging refrigerant under pressure through a conduit 11 to a condenser 12. The compressed refrigerant is cooled and liquefied in condenser

12 in any suitable or conventional manner and flows through a suitable automatic expansion valve 13 which controls the flow of liquid refrigerant to the evaporator 14. Refrigerant vaporized in evaporator 14 is drawn through a conduit 15, by suction created by the compressor 10. The evaporator 14 is adapted to be mounted within an enclosure (not shown) from which heat is to be extracted. Means for controlling a motor 16 which operates the compressor 10, through suitable belt and pulley connections 17, in response to back pressure in conduit 15 may be provided. This means may comprise an expansible bellows 18 connected by a pipe 19 to the conduit 15 leading from the evaporator 14. Upon movement of the bellows 18, a switch 22 interposed in the power line leading to motor 16 is actuated.

Operation of motor 16 drives the compressor shaft 23 through the connections 17. Rotation of compressor shaft 23 causes rotation of eccentrics 24 and 25 thereon for operating the pitmans 26 and 27 respectively to cause the compressor pistons 28 to be reciprocated within the cylinders 29. The end of the shaft 23 which extends through a wall of the compressor crankcase may be sealed by any suitable or conventional sealing means generally indicated at 31.

Referring now to Fig. 2, the refrigerant vapor coming from the evaporator 14 enters the chamber 32 which communicates with the cylinder chamber by means of an aperture 33. The usual form of piston 28 having a gas port 28a is provided which compresses the refrigerant and discharges the same through a series of annularly arranged ports 35 into the chamber 36 in the cylinder head 37. The compressed refrigerant leaves the chamber 36 through the opening 38 leading into the chamber 39 which connects with the conduit 11.

Referring to Figs. 1 and 3, the particular discharge valve structure shown is conventional and comprises an annular valve plate 40 which is held in place by means of a plurality of coil springs 41 supported in place by the retainer 42. While I have shown this particular type of discharge valve, other types of valves can also be used. In the particular compressor shown in Fig. 1, two cylinders are used; whereas, in actual practice, my invention may be used with any type of compressor. The compressor shown is provided with a rotary oil pump 43 at one end of the shaft 23 which pumps oil from the usual lubricant supply in the crankcase through the passage 44. The lubricant pump discharges lu-

bricant under pressure through the passage 45 leading to the bearing surfaces of the first pitman. The pump also discharges lubricant under pressure through a conduit (not shown) which joins up with passage 46 leading to the chamber 47 adjacent the shaft seal 31. With this arrangement, it will be noted that the shaft seal is completely surrounded with lubricant under pressure at all times so that there is no possibility of outside air being drawn into the crankcase at the seal because of a lower pressure in the crankcase than on the outside. Furthermore, with this arrangement no refrigerant will escape at the seal since the seal is completely surrounded by lubricant. With the above described lubricating system the compressor operates very silently.

Referring now to Fig. 1, it will be noted that within the cylinder head 37, I have provided a baffle 50 which is mounted directly above the discharge valve and is spaced from the end wall of the cylinder head 37. The baffle 50 is held in place by screws 51 which screw into the projections 52 provided on the cylinder head 37. The compressed medium strikes against the baffle 50 and, therefore, does not have a chance to impinge against the metallic wall of the cylinder head. This results in more quiet operation. Furthermore, tests show that the valve noises are largely absorbed by the baffle 50 with the result that the amount of valve noise transmitted to the exterior of the compressor is materially reduced. The arrangement of the baffle is such that it tends to eliminate the usual rebounding of the sound waves within the cylinder head.

The particular baffle shown includes a frame member 54 which supports a pair of screen elements 56 which in turn hold the asbestos fibers 57 in place. The asbestos fibers very effectively silence the noises yet do not deteriorate when exposed to the flow of lubricant and refrigerant. Obviously, such materials as sponge rubber which have been used exteriorly to deaden compressor noises could not be used in the cylinder head.

While I have shown a baffle utilizing asbestos fibers held in place by the metallic screens, other materials can be used for the sound deadening

baffle. The material selected, however, must be a material which will not be affected by the refrigerant and the lubricant used in the system. A wooden block, for example, can be used; but I have found that the baffle utilizing asbestos fibers is very satisfactory both from the standpoint of sound deadening and also from the standpoint of permanency.

With the above described arrangement the compressor noises are materially reduced without in any manner reducing the operating efficiency of the compressor.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. In a refrigerant compressor, a cylinder, a piston operating within said cylinder, a cylinder head, a discharge port between said cylinder and cylinder head, an outlet for the compressed refrigerant, and a sound deadening baffle suspended substantially centrally within said cylinder head and substantially out of the path of refrigerant flow whereby said baffle deadens the sound but does not materially hinder the flow of refrigerant nor the transfer of heat.

2. In combination with a refrigerant compressor having a port from which a mixture of lubricant and refrigerant are discharged, a discharge chamber, sound deadening material spaced from the walls of said chamber against which said mixture is adapted to discharge, and an outlet from said discharge chamber, said outlet and said port both being located on the same side of said sound deadening material.

3. In a refrigerant compressor having a refrigerant discharge port, a valve for said port, means enclosing said discharge port and forming a discharge chamber, an outlet from said chamber, and non-resonant material mounted within said chamber for deadening noises, said port and said outlet both being located on the same side of said material.

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