

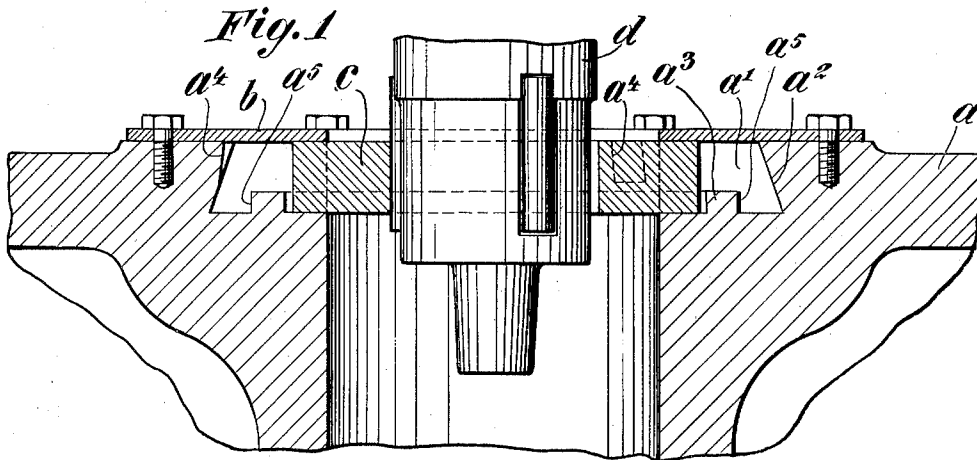
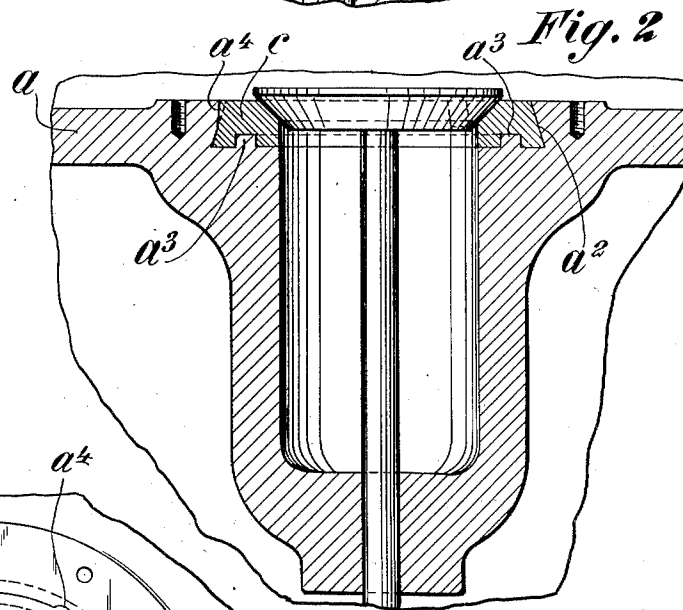
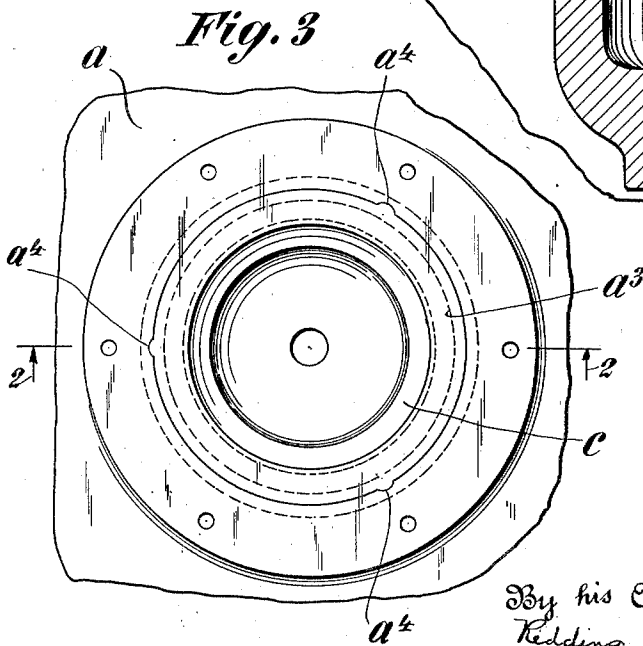
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A. H. LEIPERT

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METHOD OF MAKING VALVE SEATS

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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING VALVE SEATS.

Application filed June 5, 1928. Serial No. 282,988.

As a means for affording a more perfect valve seat and promoting the cooling thereof, it has been proposed to form the valve seat of a metal which can be rolled into position and secured against displacement in a simple and effective manner. The material of the valve seat is such that it can be readily rolled and fitted and the heat conductivity thereof is very great. A valve seat of this character is shown in the copending application of August H. Leipert, Serial No. 250,941, filed January 31, 1928, and the present invention embodies an improved and modified construction of valve seat and method of forming the same, the subject matter embodied herein relating to the same general construction as that shown in the above application.

It has been found that the joint between the valve seat and the cylinder casting can be materially improved and the heat transfer therebetween correspondingly increased if the valve seat is formed in such manner that the engagement by the undercut seat of the cylinder casting is rendered tight both when the engine is hot and when cold. By reason of the fact that the valve seat is formed of aluminum bronze and the cylinder casting of cast iron, the coefficients of expansion of these two elements differ and the expansion thereof varies with the variation in temperature.

The present invention has for an object the provision of a valve seat and method of forming the same which insures tightness thereof under all operating conditions, thus materially decreasing the temperature of the valve seat and bettering the operating conditions thereof. The invention will be understood more fully in connection with the accompanying drawings, wherein:

Figure 1 is a view in section showing the manner in which the cylinder casting is undercut to receive the seat.

Figure 2 is a view in section taken on line 2—2 of Figure 3, and looking in the direction of the arrows.

Figure 3 is a plan view of the valve and seat construction shown in Figure 2.

Referring to the above drawings, the cylinder casting *a* is formed with an annular groove *a'* which is undercut at *a²*. Protruding upwardly into the groove *a'* is an annular rib *a³* about which the valve seat is formed. In forming the seat, a recessed plate *b* is bolted to the top of the cylinder

casting and an annular ring of aluminum bronze *c* is placed as shown in Figure 1. A suitable expander *d* is then applied to force the ring *c* into the groove *a'* so that it fills the entire portion thereof as shown in Figure 2. Suitable notches *a⁴* are formed in the cylinder casting and the material of the valve seat is forced into these, thus positively securing the seat against rotation within the groove *a'*.

After the seat *c* has been expanded into the groove *a'* it is heated and then expanded again. This insures the complete flowing of the metal of the seat into every recess in the groove *a'*. If desired, the cylinder casting itself can be heated and the aluminum bronze valve seat expanded into the casting while the latter is hot, the valve seat then being re-expanded after the heating thereof.

Under operating conditions, and when the valve seat is initially heated and is expanding faster than the cylinder casting, the valve seat grips against the undercut portion *a²* of the groove *a'*. When the valve seat is contracting it grips against the external periphery *a⁵* of the rib *a³*. In this manner, the seat is rigidly held in position and movement thereof is prevented regardless of the operating conditions.

I claim as my invention:

1. The method of forming a valve seat in a cylinder casting comprising forming means in the casting to retain the seat in position, placing the metal from which the seat is formed adjacent the retaining means, expanding the metal into position, heating the metal, and again expanding the same.

2. The method of forming a valve seat in a cylinder casting comprising forming means in the casting to retain the seat in position, placing the metal from which the seat is formed adjacent the retaining means, expanding the metal into position, heating the metal, and again expanding the same while heated.

3. The method of forming a valve seat in a cylinder casting comprising forming means in the casting to retain the seat in position, placing the metal from which the seat is formed adjacent the retaining means, heating the casting, expanding the metal into position while the casting is heated, heating the metal, and again expanding the same.

4. The method of forming a valve seat in a cylinder casting comprising forming means in the casting to retain the seat in position,

placing the metal from which the seat is formed adjacent the retaining means, heating the castings, expanding the metal into position while the casting is heated, allowing the casting to cool, heating the metal, and again expanding the same.

5. The method of forming a valve seat in a cylinder casting comprising forming means in the casting to retain the seat in position,

placing the metal from which the seat is formed adjacent the retaining means, heating the casting, expanding the metal into position while the casting is heated, allowing the casting to cool, heating the metal, and again expanding the same while heated.

This specification signed this 31st day of May, A. D. 1928.

AUGUST H. LEIPERT.