prejudice the performance of the pump in low rotation speeds.

Regarding the second factor, it shall be noted that the higher the upsetting height, the greater the energy necessary for pumping, since the oil shall be elevated up to the input orifice of the first bearing of the compressor. Subsequently, the propeller of the shaft will do the remaining pumping work.

With respect to the third factor, it shall be noted that the radius or diameter of the pump in the oil output region (i.e., in the region of the input orifice of the first bearing of the compressor) is fundamental to the efficiency of the pump. This is due to the fact that the path followed by the oil through the shaft interior up to such output orifice shall consider the parabolic form acquired by the oil from its centrifugation, wherein no protuberance can intercept such parabola (if an interception occurs, the flux of oil will be simply interrupted).

In view of the foregoing, the design of the pump has an important role in the performance of the compressor, further considering the need of a pump that is suitable for a compressor operating at a reduced rotation.

Summary~~Objectives~~ of the Invention

Thus, embodiment~~one of the objectives~~ of the invention seek to provide~~is the provision of~~ an efficient oil pump for being utilized with a hermetic compressor having a variable speed driver.

Embodiments~~Another objective~~ of the present invention seek to provide~~is the provision of~~ an oil pump designed to efficiently actuate in a compressor operating at a reduced rotation.

~~Summary of the Invention~~

~~The present invention achieves the above mentioned objectives by means of~~According to an embodiment, there is provided a hermetic compressor comprising a shell which involves the component parts of a compressor, an oil reservoir in the inferior part of the shell, a cylinder block that incorporates a bearing to support a vertical shaft on which a rotor is assembled, and a centrifugal pump that leads the oil to the moving parts of the compressor, wherein said vertical shaft extends axially from the rotor to form a free end in its inferior portion, the free end being sized to be received in a corresponding end of the centrifugal pump, and at least one portion of the inner sidewall of the end of the pump and at least one portion of the outer sidewall portion of the shaft assuming a juxtaposed condition after the reception.

In order to avoid the unnecessary use of raw material, the free end of the vertical shaft extends axially, and only enough, to enable the attachment of the end of the pump, wherein, in a preferred embodiment, the free end of such vertical shaft extends up to a maximum of 6 mm.

Furthermore, in said preferred embodiment of the present invention, the free end presents a machined portion having a reduced external diameter in order to facilitate the assembly of the end of the pump.

The assembly between the free end of the shaft and the corresponding end of the

pump is preferably effectuated by interference fit, but alternative means, such as binding, would be equally used.

According to an aspect, there is provided a hermetic compressor comprising a shell which involves the component parts of the compressor, an oil reservoir in the inferior part of the shell, a block cylinder incorporating a bearing to support a vertical shaft on which a rotor is assembled, and a centrifugal pump to lead the oil to the moving parts of the compressor, wherein said vertical shaft extends axially from the rotor to form a free end in its inferior portion, said free end presenting a machined portion having a reduced external diameter and being sized to be received in a corresponding end of the centrifugal pump, and at least one portion of the inner sidewall of the end of the pump and at least one portion of the outer sidewall portion of the shaft assuming a jux-taposed condition, wherein the free end of the vertical shaft extends up to a maximum of 6mm.

Concise Description of the Drawings

The figures show:

Figure 1 – Figure 1 illustrates a cut view of a conventional hermitic compressor comprising a pumping solution that is already known in the prior art;

Figure 2 – Figure 2 illustrates a cut view of a conventional hermetic compressor comprising another pumping solution that is already known in the prior art;

Figure 3 – Figure 3 illustrates a cut view of a hermetic compressor comprising the pumping solution provided by the present application;

Figure 4 – Figure 4 illustrates a detailed cut view of the oil pump of the present invention, which is assembled on the compressor shaft.

Detailed Description of the Invention

The present invention will be described below, in a detailed manner, with basis on the examples of execution that are represented by the drawings. Although the detailed description utilizes, as an example, an alternative compressor for refrigeration, it shall be understood that the principles of the present invention can be applied to any type, size or configuration of hermetic compressor.

Figures 1 and 2 illustrate compressors comprising pumping solutions that are already in the prior art.

In the solution illustrated in figure 1, the oil pump (1) is inserted in the rotor of the engine (2). The pump (1) has an end (3) plunged in the oil (4) disposed in a reservoir of the shell (5) and another end (6) inserted in the rotor (2). This configuration creates a free pathway for the oil, but restricts the region that is available for attaching the shaft (7) and the pump. In fact, as shown in such figure, the shaft (7) is continuous up to the superior end (6) of the pump.

In the solution illustrated in figure 2, the pump (1) is inserted in the shaft (7), wherein said shaft (7) extends up to the end of the rotor (2). This configuration improves the region that is available for attaching the shaft (7), but the diameter of the oil passage is affected to enable the insertion of the pump in the shaft.

The solution adopted by the present invention is illustrated in figures 3 and 4. As can be noted upon reading the detailed description of such figures, the present invention discloses a pumping solution capable of guaranteeing a suitable diameter for passing the oil, an optimization of the upsetting height, and a simplified assembly means for the oil pump.

Thus, in the compressor of the present invention which is illustrated in figure 3, the shaft (7) extends slightly from the rotor (2), leaving a free end (8) to enable the assembly of the centrifugal pump (1).