US 20120006191A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2012/0006191 A1

(43) Pub. Date: Jan. 12, 2012

Ribeiro

(54) AIR OR GAS COMPRESSION SYSTEM

(76) Inventor: **Renato Bastos Ribeiro**, Porto Alegre (BR)

(21) Appl. No.: **13/178,811**

(22) Filed: **Jul. 8, 2011**

Related U.S. Application Data

(60) Provisional application No. 61/363,573, filed on Jul. 12, 2010.

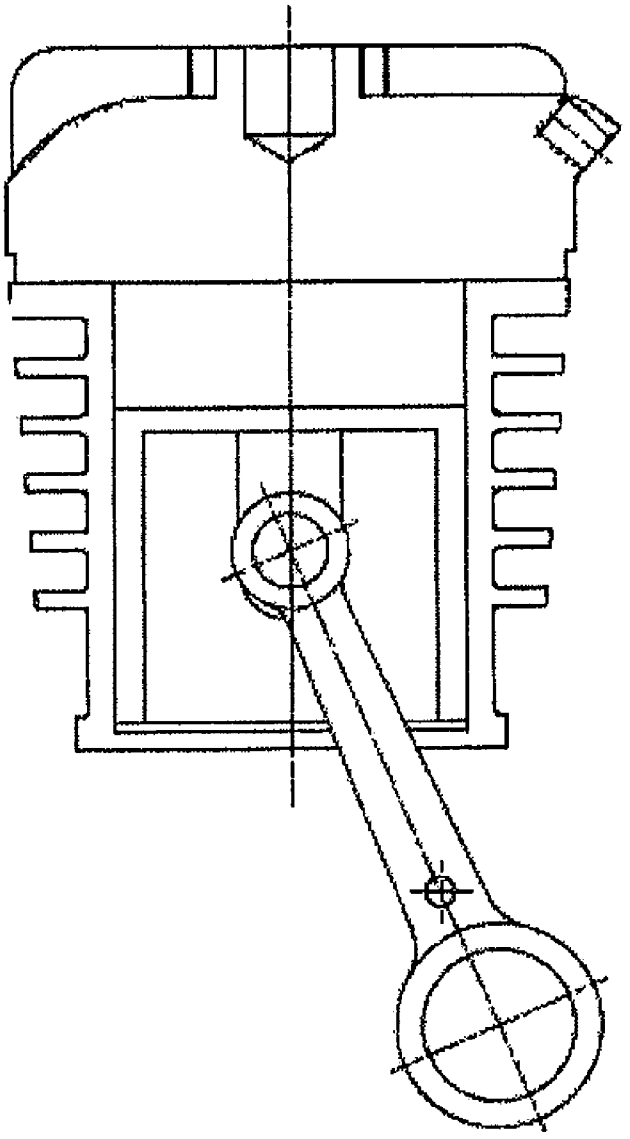
Publication Classification

(51) **Int. Cl.**
F04B 39/00 (2006.01)

(52) **U.S. Cl.** **91/418**

(57) **ABSTRACT**

A gas compression system is disclosed that includes a hollow cylinder having a cylinder wall, a reciprocal piston carried within the cylinder, and a piston rod connected to the piston. Gas compression control within the cylinder is determined by providing at least two closable openings through the cylinder wall that become closed as the reciprocal piston approaches top dead center within the cylinder. The spacing of the openings is preferably diametrically opposite one another.



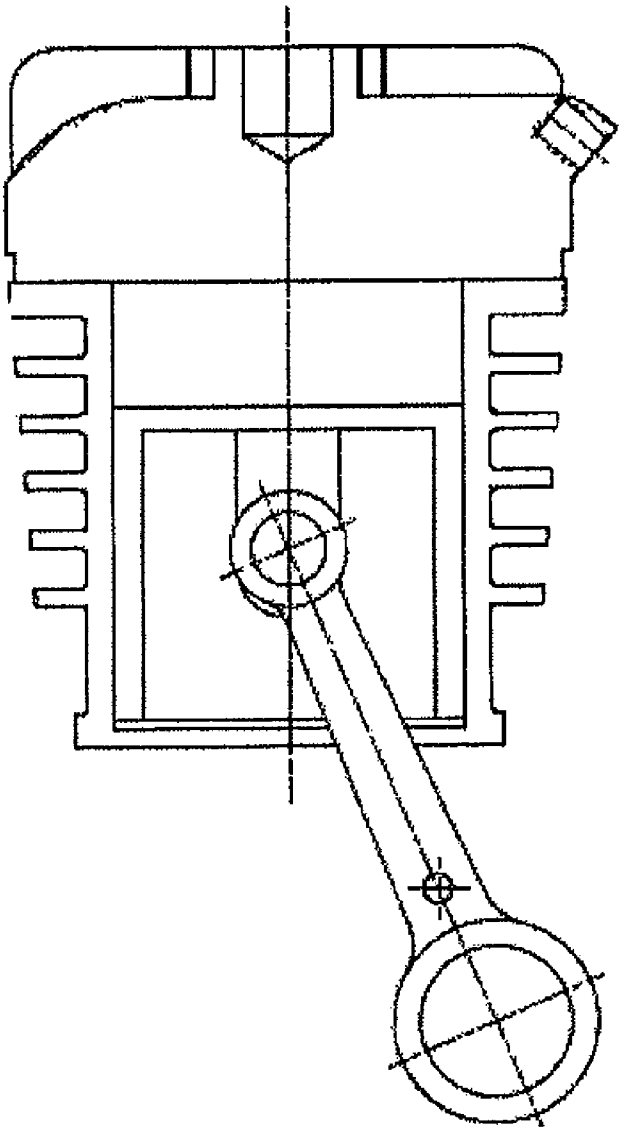


Fig. 01

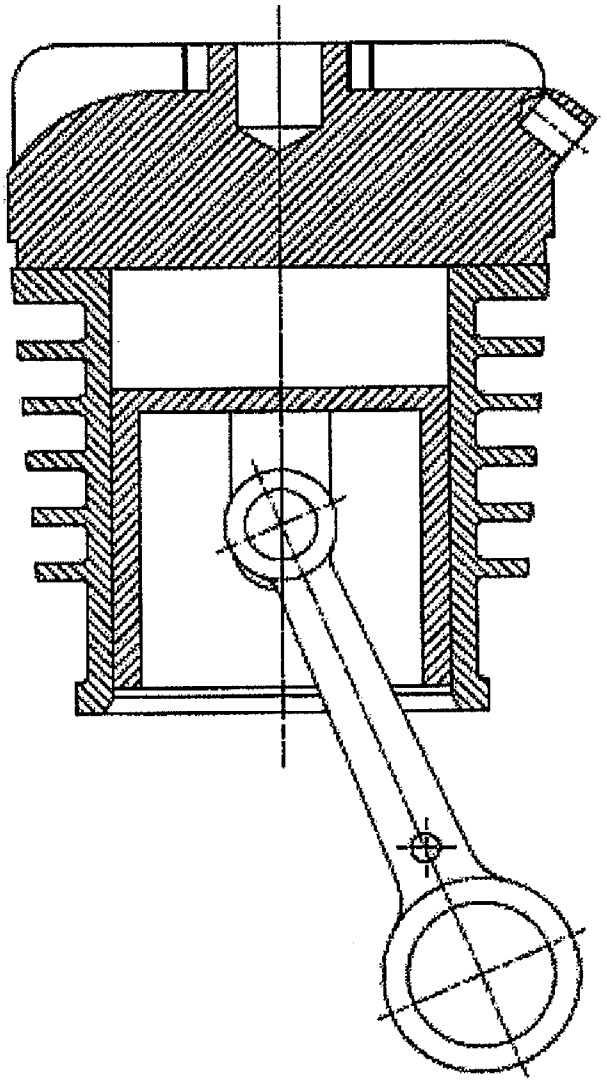


Fig. 02

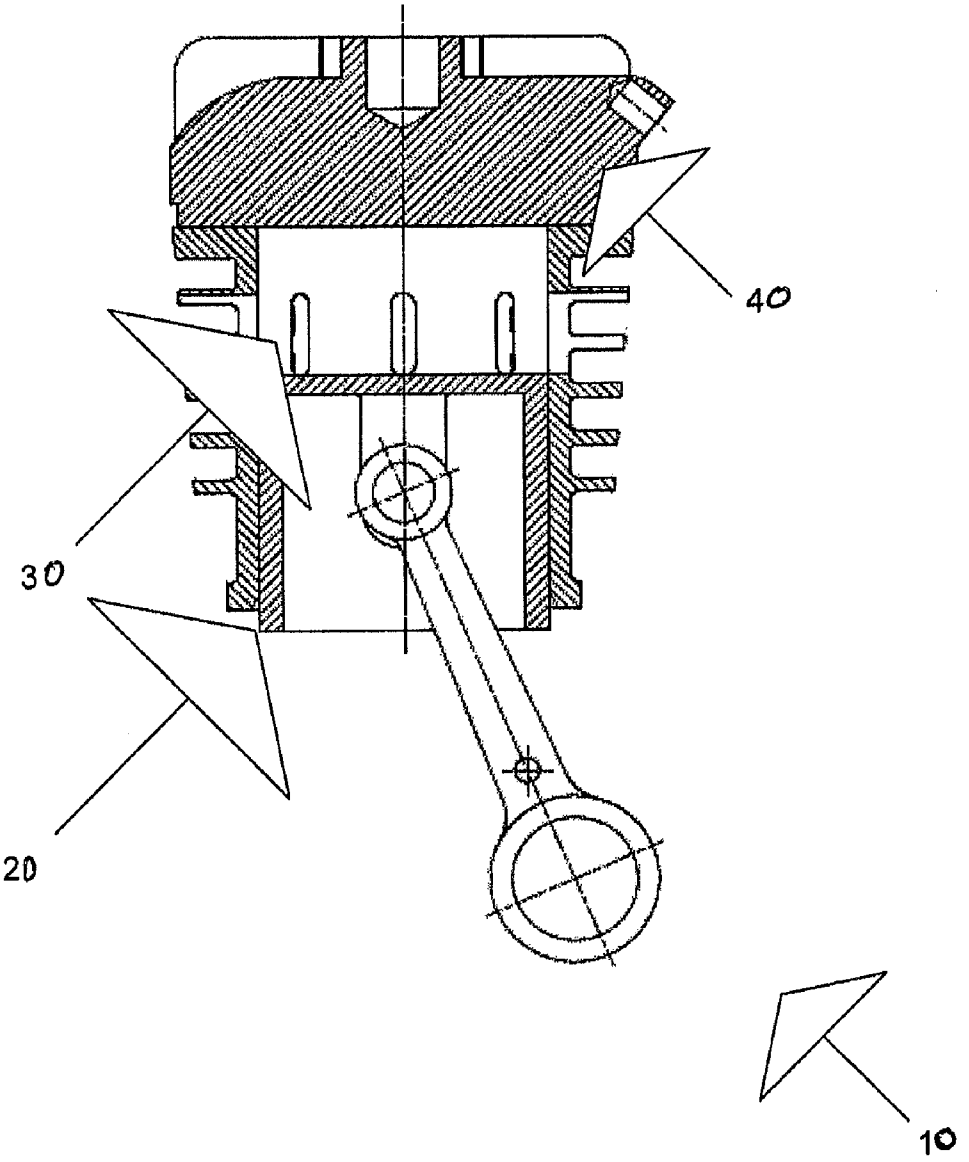


Fig. 03

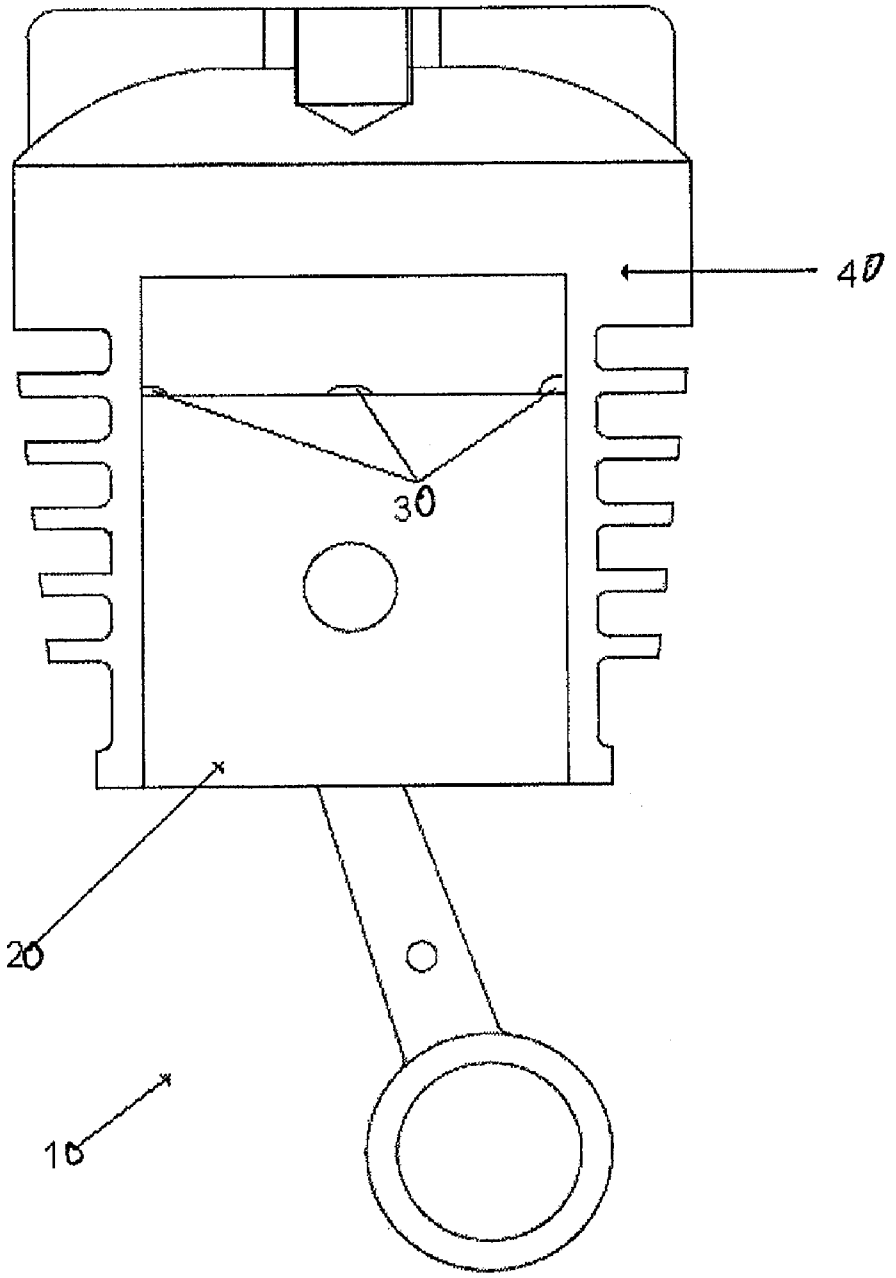


Fig. 04

AIR OR GAS COMPRESSION SYSTEM

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of priority of U.S. Provisional Patent Application Ser. No. 61/363,573, entitled AIR COMPRESSOR, filed Jul. 12, 2010.

FIELD OF INVENTION

[0002] This invention relates to an air or gas compression system carried by piston along the cylinder which has diametrically located openings distributed in order to determine the compression ratio.

DESCRIPTION OF THE RELATED ARTS

[0003] The compression piston is a generally cylindrical piece that is carried inside each one of preferably a plurality of cylinder chambers. Each cylinder has a piston in its chamber. This piston component is most often cast in light alloy and moves rectilinearly in two directions, up and down within its cylinder chamber, and its main role is to receive, when at its upper position within the cylinder chamber, the explosion of the mixture of air and fuel. The explosion of the fuel/air mixture generates a mass movement of expanding gases within the combustion chamber and the piston receives this force and moves away from the head of the cylinder chamber, thus enlarging the chamber space. Of different sizes, geometries, and forms the pistons have different functions depending on the type of equipment in which is installed.

[0004] The compression height is the distance between the top and center of the existing hole in the piston pin. This height is an important measure because through it we can be sure that the piston is at top dead center with the correct distance in relation to the head, thus obtaining an appropriate rate for combustion.

[0005] Normally a piston compression system has **4** time being the admission, when the cylinder is filled with air and fuel, the compression of air and fuel, the combustion that pushes the piston down and finally the elimination of the exhaustion gases.

[0006] There is usually an unnecessary expenditure of energy since the compartment where air and fuel are admitted is larger than necessary. To avoid this waste of energy, it is often performed a reduced compression height, in order to that occur, we need a block or to change the machining of the crankshaft, thereby altering the original geometrical projection of the parts.

[0007] The compression height, i.e., of the area that will effectively carry out the compression of air or gas, is the distance between the top of the cylinder cavity and the center hole of the piston. It is through this length that we know if the piston is at the right point and the correct distance in relation to the cylinder in order to obtain an appropriate rate of combustion.

[0008] When we define a system of compression by pistons, in order to achieve the desired compression, it is necessary to provide a predetermined space in relation to the head of the cylinder when the piston is at its highest position, i.e., top dead center.

[0009] Any change in the compression system will result in a several malfunctions, which affect mostly the pistons, which suffer from various marks of the system, the crankshaft is reduced resulting in a piston height above the recommended and to correct this height it is used the practice of lowering the top, which changes the original design reducing the life of system components.

OBJECTIVE OF THE INVENTION

[0010] The present invention consists of the air or gases compression system carried by the piston where, to solve the existing problems in the prior art, openings are placed along the walls of the cylinder. The portion of the piston stroke that will represent the active part of the gas compression is where these openings are closed. For this to properly occur, the cylinder must have at least two openings always diametrically distributed through the cylinder wails to the chamber within the cylinder body.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. **1** represents a front view of a compression system found in the state of the art;

[0012] FIG. **2** represents a vertical cross-sectional view of the compression system shown in FIG. **1**;

[0013] FIG. **3** represents a vertical cross-sectional view of a preferred embodiment of a compression system in accordance with the present invention in which the piston is located at a position within the cylinder at which the longitudinal openings along the cylinder body are exposed;

[0014] FIG. **4** represents a vertical sectional view of the embodiment of a compression system as shown in FIG. **3** in which the piston has moved vertically within the cylinder such that the longitudinal openings along the cylinder body are almost closed.

DETAILED DESCRIPTION OF THE INVENTION

[0015] Referring now to FIG. **3**, one embodiment of a compression system **10** in accordance with the invention comprises a cylinder (**40**) carrying within it a compression piston (**20**). The cylinder (**40**) in which the piston will act includes at least two openings (**30**) passing through the peripheral wall of the cylinder **40**. These openings **30** are specifically sized in relation to the total stroke of the piston **20** as it moves between top dead center and bottom dead center. We will define and describe a specific part of the piston stroke to be the active part of the compression, i.e., that part where the compression will actually be held.

[0016] A piston **20** in motion, will only begin the work of compression when it reaches the end of the openings **30** and thus closes off the openings **30**. As the piston **20** is rising and there remains a part of at least one of the openings **30** still visible there will be no compression. When the piston **20** completely covers the last opening **30**, then gas compression will start.

[0017] These openings **30** are preferably diametrically arranged according to the size of the equipment. Thus, it allows us to define in which part of the course of travel of the piston **20** within the cylinder **40** will the compression of air or gases effectively occur.

[0018] In a preferred embodiment of the present invention, the system **10** has four longitudinal openings **30** spaced symmetrically around the cylinder **40**.

[0019] It must be clear to the technical experts that the current invention can be set in many other specific forms without losing the spirit of the invention. It must be understood that particularly the invention can be set in the described forms.

[0020] In this sense, the examples and incorporations shown must be considered illustrative, and not restrictive, and this invention must not be limited to the details provided in this document, but it can be modified within the limits and equivalences of the invention.

1. A gas compression system comprising:
a hollow cylinder having a cylinder wall;
a piston carried within the cylinder; and
a piston rod connected to the piston;
wherein gas compression control within the cylinder is determined by at least two closable openings through the cylinder wall.

2. The compression system according to claim **1**, wherein the compression control is accomplished through at least two openings diametrically distributed in the cylinder.

3. The compression system according to claim **1**, further comprising the openings being preferably elongated in a longitudinal direction along the cylinder wall.

4. The compression system according to claim **2** further comprising the openings being elongated in a longitudinal direction along the cylinder wall.

5. The compression system according to claim **1** wherein the openings are closed when the piston is at a top dead center position within the cylinder.

6. The compression system according to claim **5** wherein the openings are closed before the piston reaches the top dead center position within the cylinder.

* * * * *