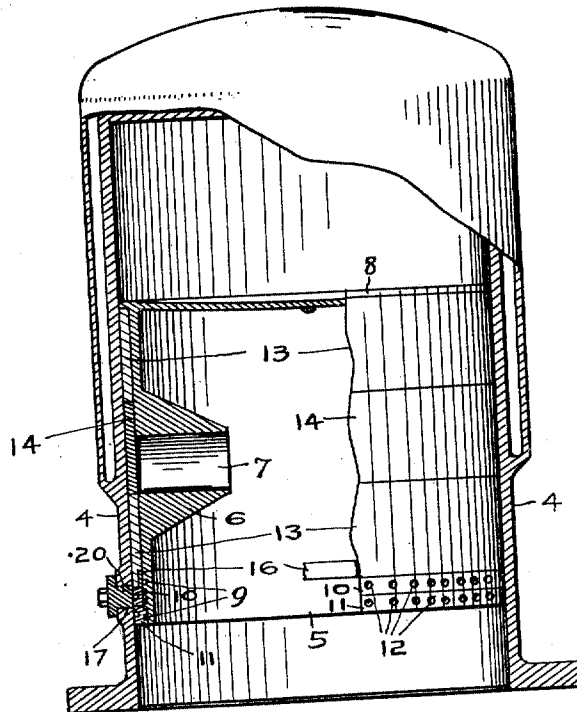


VAN DOLAH MORRISON & A. H. SCHLAEGEL.  
 PISTON AND CYLINDER CONSTRUCTION.  
 APPLICATION FILED JUNE 13, 1910.

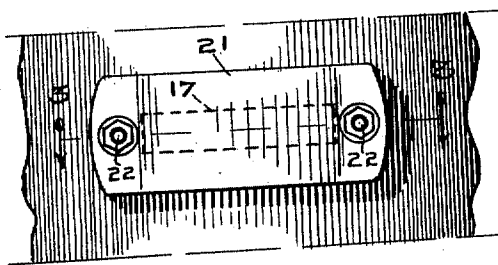
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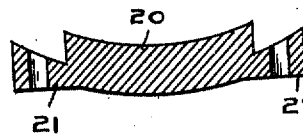
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

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## PISTON AND CYLINDER CONSTRUCTION.

984,837.

Specification of Letters Patent.

Patented Feb. 21, 1911.

Application filed June 13, 1910. Serial No. 566,661.

*To all whom it may concern:*

Be it known that we, VAN DOLAH MORRISON and ALBERT H. SCHLAEGEL, citizens of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Piston and Cylinder Construction, of which the following is a specification.

This invention relates to improvements in piston-packing wherein a porous and readily compressible body forms the vehicle for graphite or other lubricant as a substitute for the elastic metal expansion rings in common use.

The object of the invention is, first, to provide means for compressing the packing laterally to cause it to increase in diameter and make a tight fit against the inner walls of its cylinder, at the initial installation of the packing and also thereafter as the packing becomes worn by use.

The object also is to provide ready and convenient access through the side of the cylinder for adjusting said compressing means, without detracting from the efficiency of the cylinder.

We accomplish the objects of the invention by the mechanism illustrated in the accompanying drawing, in which—

Figure 1 is a view in side elevation and partial vertical section of a cylinder and piston provided with our invention; Fig. 2 is a detail in exterior elevation of a cylinder showing our manner of interior access through the side wall of the cylinder, and Fig. 3 is a section on the line 3—3 of Fig. 2, of the closure for the cylinder port.

Like characters of reference indicate like parts throughout the several views of the drawings.

4 represents a cylinder, here shown as the cylinder of an explosive engine.

5 is a hollow piston having internal bosses 6 with the usual sockets 7 to receive a wrist pin by which the piston is attached to a connecting rod. The two last parts, being of usual construction, are not shown in the drawings. The outer end of the piston terminates with a circumferential annular flange 8 to retain the packing. The other end of the piston is provided with external screw threads 9, to receive a corresponding internally screw-threaded ring 10 and a following or locking ring 11. Both rings 10

and 11 are provided with a series of peripheral spanner-holes 12 for the attachment of a spanner wrench in moving the rings on the piston.

One or more packing bands 13 may be used. We have here shown two of them, separated by a metal band 14 which preferably fits loosely in the cylinder and separates the two packing bands. The packing bands 13 will preferably be of a composition of our own invention comprising the alloy of antimony, tin and copper commonly known as Babbitt metal combined with asbestos to form a porous and elastic vehicle which is filled with powdered graphite as a lubricant. This composition for which we are about to make separate application for patent, is pliable under such pressure as we can give to it between the flange 8 and rings 10 and 11 by screwing the latter rings against the packing bands in the manner shown in Fig. 1. Such lateral compression causes the above composition to increase in thickness diametrically of the piston making a tight fit between the piston and cylinder which can be regulated and controlled by the positions of said rings 10 and 11. Obviously, as leakage due to wear, occurs this can be corrected by readjusting or screwing the rings 10 and 11 farther upon the piston.

To keep the material of the packing bands from entering the threads on the piston we provide a thin metal sleeve 16 to cover the exposed threads.

It is possible, of course, to remove the piston from the cylinder sufficiently to afford access to the rings 10 and 11 for tightening the latter against the packing, but under many associated conditions of the use of our invention this manner of access would be very inconvenient. We have, therefore, provided a suitable slot opening or port 17 through a side of the cylinder (shown in dotted lines in Fig. 2) through which a suitable spanner wrench may be introduced and applied to rings 10 and 11 to move the latter. The piston will be moved to bring the rings 10 and 11 consecutively opposite the port 17. When the port is not needed it will be normally closed by a metal plug 20 first made to accurately fit the port opening, and having an extended plate 21 by which the closure is removably fastened to the cylinder by means of bolts 22. In practice this plate and plug are fitted and fas-

tened to the cylinder before the latter is bored and thereby the inner face of the plug is made to conform accurately to the bore of the cylinder.

5 As will be understood, the composition of the packing bands, and the sizes and number, and the means of access through the side of cylinder may be varied according to the particular requirements and circumstances, 10 and while the adaptation shown and described is the best now known to us, it may be variously modified by those skilled in the art without departure from our invention.

15 Having thus fully described our invention, what we claim as new and wish to secure by Letters Patent, is—

1. The combination, with a cylinder, of a piston, a compressible packing on the piston containing a lubricant and means on the 20 piston for applying lateral pressure to the packing to increase the thickness of the packing, diametrically of the piston.

2. The combination, with a cylinder, of a piston having a stop at one end, an adjustable ring at the other end of the piston, a compressible packing containing a lubricant located on the piston between said stop and ring and means for adjusting the ring to in- 25 crease the compression of the packing.

3. The combination, with a cylinder, of a piston having a flange at one end and screw threads at the other, a threaded ring on the threaded end of the piston, and a compressible packing containing a lubricant located 30 on the piston between said flange and ring.

4. The combination, with a cylinder, of a piston having a stop at one end, an adjustable ring at the other end of the piston, a pliable packing located on the piston be- 35 tween the said stop and ring, and means for adjusting the ring through the side of the cylinder.

5. The combination, with a cylinder having a port through its side wall, of a removable closure for said port, a piston having a 40 flange at one end and screw threads at the other, a threaded ring on the threaded end of the piston adjustable through said port in the cylinder, and a pliable packing located on the piston between said flange and 45 ring.

6. The combination, with a cylinder having a port through its side wall, of a close fitting removable plug for said opening corresponding on its inner face with the bore 55 of the cylinder, a piston having a flange at one end and screw threads at the other, a pair of threaded rings on the threaded end of the piston, said rings having spanner holes which are accessible through said port 60 in the cylinder, and a pliable packing located on the piston between said flange and rings.

7. The combination, with a cylinder, of a piston having a flange at one end and screw 65 threads at the other, a threaded ring on the threaded end of the piston, a pliable packing containing a lubricant located on the piston between said flange and ring, and a sleeve over the threaded portion of the piston under the packing to keep the packing 70 from entering said threads.

8. The combination, with a cylinder, of a piston having a circumferential seat for a packing, peripheral recesses in said seat, a 75 compressible packing containing a lubricant, located in said seat, means for compressing the packing to increase its thickness diametrically of the piston, and a sleeve over the recesses of the packing seat to keep the 80 packing from entering said recesses.

In witness whereof we have hereunto set our hands and seals at Indianapolis, Indiana, this 4th day of June, A. D. one thousand nine hundred and ten.

VAN DOLAH MORRISON. [L. S.]

ALBERT H. SCHLAEGEL. [L. S.]

Witnesses:

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