Feb. 10, 1942. T. A. BOWERS 2,272,687

PACKING

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Fig. 1.

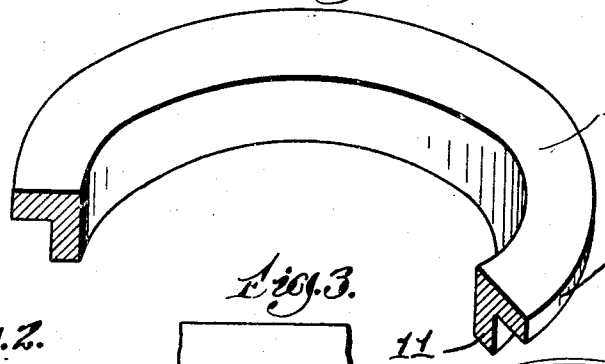


Fig. 3.

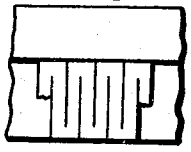


Fig. 2.

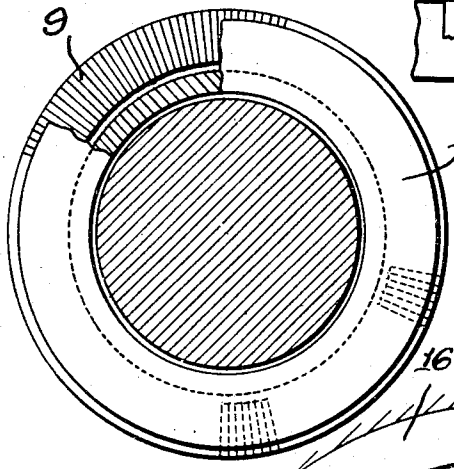
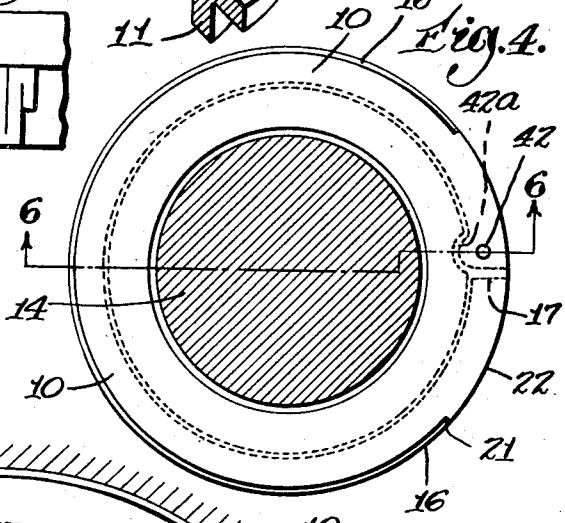


Fig. 4.



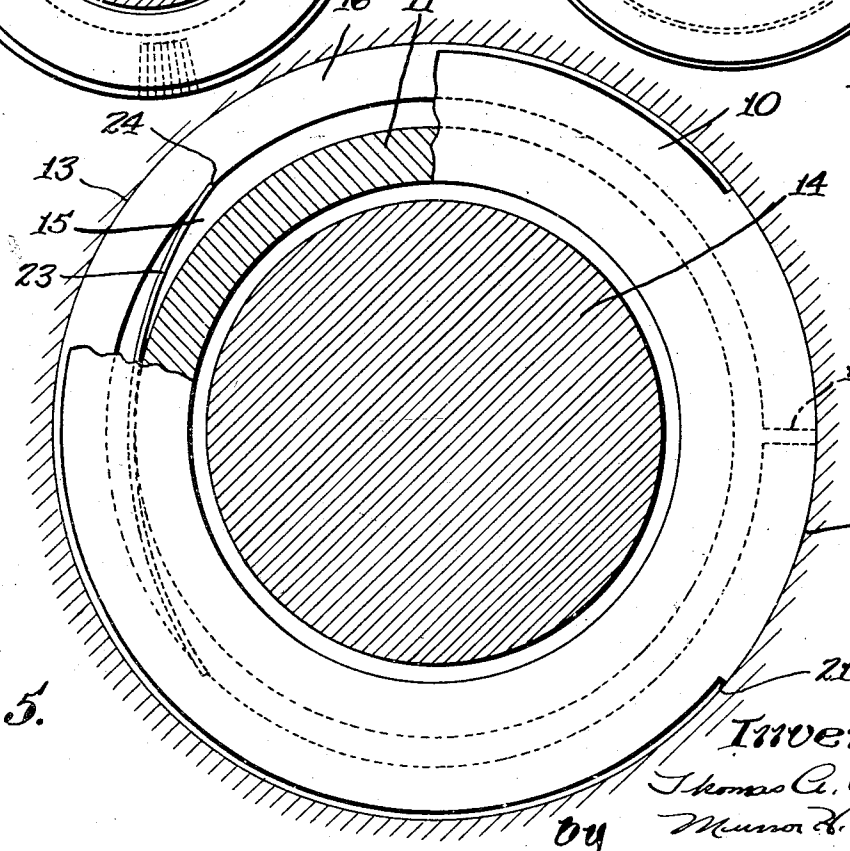


Fig. 5.

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Fig. 6.

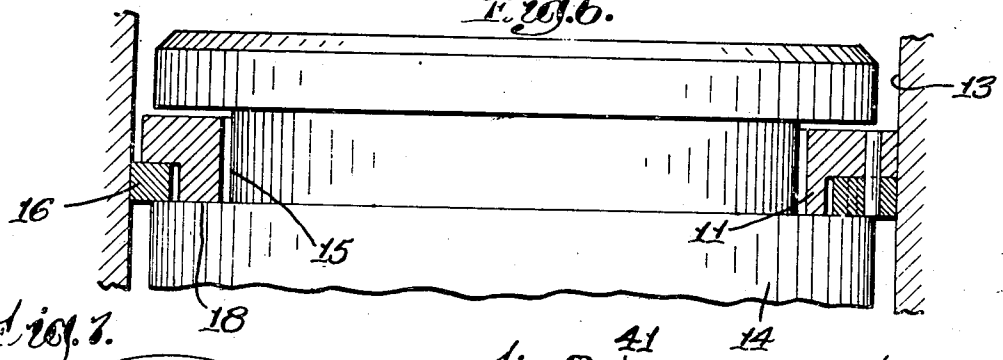


Fig. 7.

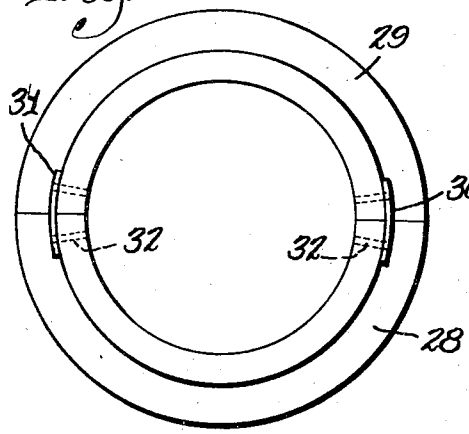


Fig. 8.

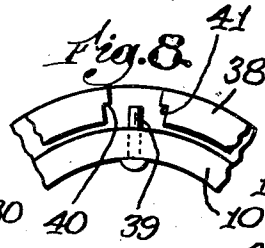


Fig. 9.

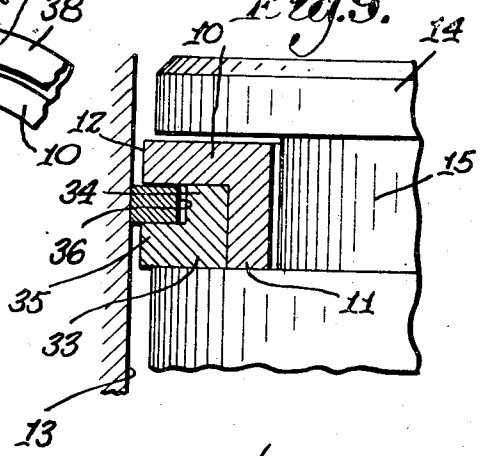


Fig. 10.

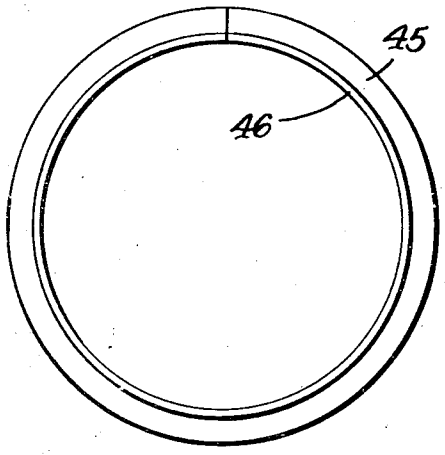
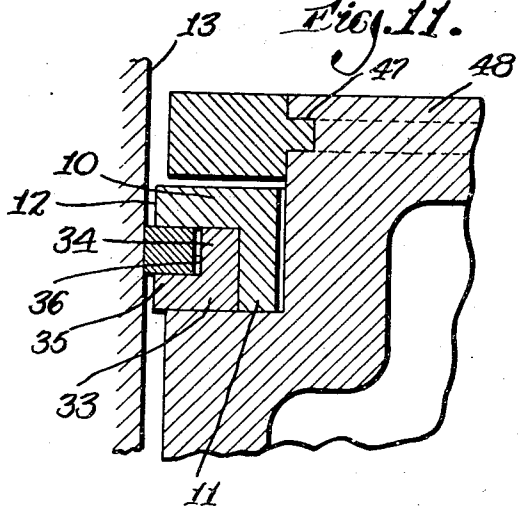


Fig. 11.



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Fig. 12.

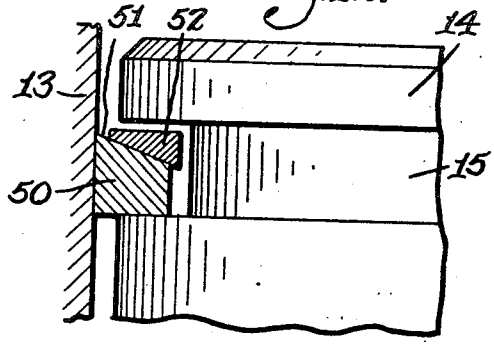


Fig. 13.

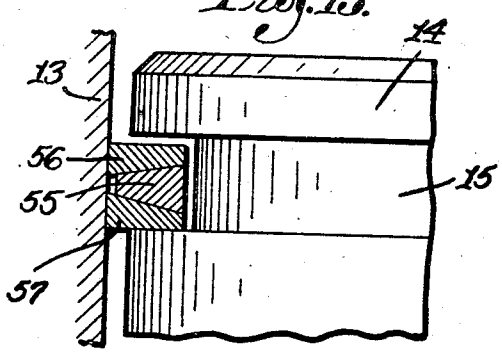


Fig. 14.

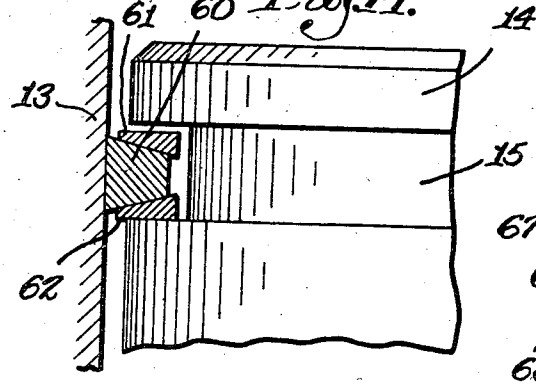


Fig. 15.

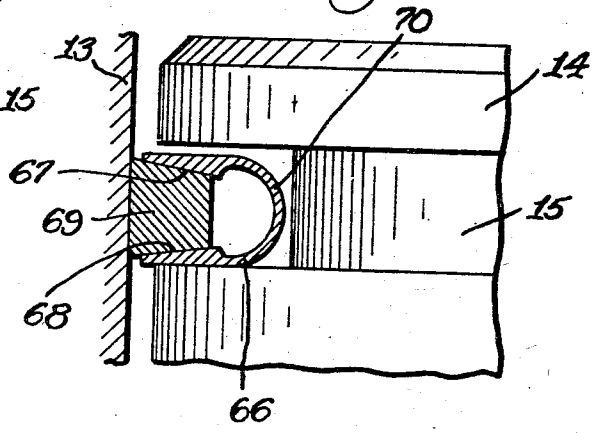


Fig. 16.

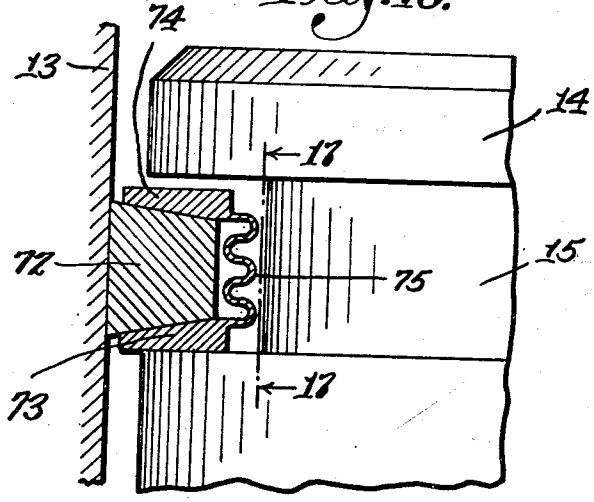
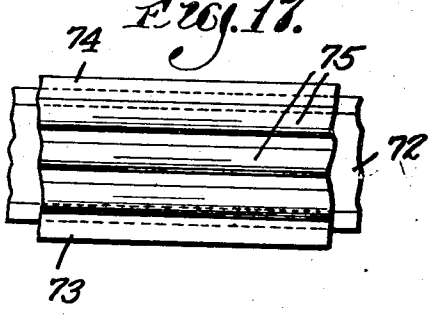


Fig. 17.



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UNITED STATES PATENT OFFICE

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PACKING

Thomas A. Bowers, Boston, Mass.

Application March 21, 1939, Serial No. 263,216

3 Claims. (Cl. 309—29)

This invention relates to packing rings, and rings intended generally to effect a seal between relatively reciprocating bodies, as in combustion motors, steam engines, pumps, compressors and the like.

A principal object of the invention is to provide an improved and a simple, efficient, cheap and durable sealing means. Other objects are to develop in a sealing means a substantially constant radial wall pressure exerted uniformly around and against a cylinder periphery, thereby to overcome tapered wear on the cylinder; to prevent or reduce fluctuation in wall pressure by protecting the sealing means from fluctuating pressures, such as pressures resulting from combustion gases, occurring in back of the sealing means and tending variably to expand such means against the cylinder; to establish an optimum wall pressure value which will most advantageously present satisfactory sealing of gases with occurrence of proper oil lubrication and dissipation of heat for minimizing frictional wear; to make available means in a sealing member, for resisting back pressure and means for minimizing the transmission of fluid pressure through a sealing member; and generally to present gas sealing and oil control means having a very greatly increased operating life and improved efficiency value.

The invention consists in means and combination suitable for accomplishing the foregoing objects as explained in the following specification and includes not only the specific embodiments so described but all substantial equivalents thereof within the scope of the appended claims.

The present invention comprehends a new principle of effecting a seal between relatively reciprocating bodies which may be generally understood as sealing by controlled compression, and by which I protect a sealing member and either shut out, limit, or substantially equalize fluctuating gas pressures tending to force the sealing member, or parts of it, against the cylinder with varying gas pressure intensities. As illustrative of a protective means of the character referred to, there is presented a packing in which occur what may be termed zones. Various packing zone arrangements may be employed and various types of structures may be used in the packing to comprise zones.

An important aspect of the principle referred to is in maintaining constant wall pressure values and the overcoming of wear. A sealing structure which does not present a uniformly equal wall pressure all the way around a cylinder periphery, as for instance a C-type cast iron ring, may, together with the effect of "piston slap," tend to wear the cylinder "egg-shaped," or out of round. Furthermore, if wall pressure is not maintained substantially uniform and independent of fluctuating gas pressures during the cycle of movement of a piston in its cylinder, the cylinder develops tapered wear; that is, the cylinder wall is worn away in a tapered manner with the greatest amount of wear occurring at that locus where the sealing member stops at the end of its compression stroke and where greatest gas pressure is present.

It has been found that the reason for the occurrence of "tapered wear" is almost entirely due to "back" pressure, or that pressure resulting from gases passing around in back of a piston ring, tending to increase and open its circumferential length and force it radially outward against the cylinder wall with augmented wall pressure in varying degrees of intensity.

The greatest ring pressure will occur when the piston is at or near the top of its stroke, where the gas pressure and resistance of the piston are at a maximum. The gas pressure and piston resistance decrease as the latter moves down the cylinder and it has been shown by experimental test runs that the tapered wear is directly related to measured fluctuating pressure.

It will be readily understood that tapered wear may be more pronounced in combustion motors from combustion gas pressures and the following description is particularly exemplary of sealing means for such motors. However, this is done in no limiting sense with respect to other types of reciprocating bodies. I may apply the structures herein disclosed or similar ones to other types of mechanism, as steam engines, pumps, compressors and the like.

In the accompanying drawings:

Fig. 1 is a perspective view, partly broken away and partly in cross section, illustrating a cover ring as hereinafter described in the specification;

Fig. 2 is a plan view in partial cross section illustrating the association of a cover ring such as indicated in Fig. 1 with a piston ring formed of a reversely folded material; the material being circumferentially expansible and presenting no gap;

Fig. 3 is a fragmentary elevational view of the assembly shown in Fig. 2;

Fig. 4 is a plan view of a modification of cover member associated with another type of piston ring; the piston ring being of the cast iron C-type and presenting a gap;

Fig. 5 is a plan cross section of a piston in a cylinder, equipped with a C-type ring, and expander, with a modification of cover ring similar to that shown in Fig. 4 appearing in enlarged plan view;

Fig. 6 is a view in cross section taken on the line 6—6 of Fig. 4;

Fig. 7 is a bottom plan view of a cover ring formed in sections and provided with joining means;

Fig. 8 is a detail plan view of a cover ring, a

cast iron ring, and means for maintaining the cover and the ring in substantially fixed position with respect to one another;

Fig. 9 is a view fragmentarily illustrating in elevation a piston with another modification of cover ring structure illustrated in cross section and associated with the piston and a sealing member;

Fig. 10 is a plan view of a ring body suitable for comprising a portion of a piston head;

Fig. 11 is a fragmentary view in cross section of a piston illustrating the use of a ring similar to that shown in Fig. 10 to comprise a portion of the head of the piston ;

Fig. 12 is a fragmentary elevational view of a piston illustrating another modification of cover ring and sealing ring assembly;

Fig. 13 is a view similar to Fig. 12 illustrating another modification of sealing ring and cover ring assembly;

Fig. 14 is a view similar to Figs. 12 and 13 and illustrates another modification of sealing ring and cover ring assembly.

Fig. 15 is a view similar to Figs. 12–14 inclusive and illustrates still another modification of sealing ring and cover ring assembly;

Fig. 16 is a view similar to Figs. 12–15 inclusive and illustrates still another modification of sealing ring and cover ring assembly; and

Fig. 17 is a detail rear elevation taken on the line 17—17 of Fig. 16.

Referring to the drawings, in Fig. 1, I have illustrated a cover ring 10. I have chosen to call this element a "cover" ring for the reason that it covers a part of other ring structure and acts as a protecting member. The cover may occur in several different forms, as hereinafter referred to in the drawings, while serving as a protecting member. In all these forms, the protecting function of the cover may be to either shut out, to limit, or to equalize fluctuating pressures developing on the sealing member of a combustion motor, with particular reference being had to the back side of the sealing member.

As noted above, varying zone arrangements have been referred to with further reference to varying types of structures making up the zones. The cover ring comprises one of the structures referred to. Among other structures proposed for assembly with the cover ring to present additional zones, I may employ flexion rings having no gap such as disclosed in my earlier Patent No. 2,076,544; and I may also employ other types of rings as for example, the usual cast iron C-type rings and others.

Reference will first be had to the combination of a flexion ring with a cover ring such as 10. In this combination the cover may be constructed in its simplest form. Reference will also be had to the combination of a C-type ring with a cover member, in which case additional means in the cover may be present and the cover may function to some extent in a different way.

In Fig. 1, one type of cover ring has been shown with a portion cut away, and ends appearing in cross section. A preferred form of ring will comprise a solid, unbroken, substantially circular body having a definitely fixed perimeter. If desired, ring sections with means for locking the ends of the ring sections together, as has been indicated in Fig. 7, may be employed. Therefore, while general reference to a cover ring in the specification is to a ring with a closed and fixed perimeter, this perimeter need not be fixed in the strict sense of the word.

The cover ring shown in Fig. 1 is constructed with an upstanding ring portion 11 and a flange portion 12 formed at right angles to the ring portion 11 and in Figs. 2 and 3 I have illustrated a packing assembly made up of this cover ring and a sealing member 9 composed of material described in the above referred to patent. The material of this patent comprises a length of metal ribbon reversely folded upon itself and compacted to present a substantially solid body. It is pointed out that this type of material is circumferentially expansible, within the strict meaning of this statement, and as a result when installed about a piston in a cylinder may be arranged to present no gap. The cover ring shown in Fig. 1 is particularly suited to use with a sealing ring having no gap such as the flexion ring just described.

A modification of cover ring assembly with a C-type cast iron ring is illustrated in Fig. 4 and in Fig. 6 there has been indicated an inner periphery 13 of a cylinder in which is received a piston 14 having formed therein piston ring grooves 15 in the conventional manner. 16 denotes the C-type cast iron ring mounted in the piston groove and engaging with the cylinder periphery. A gap 17 occurring between the ends of the C-type ring 16 has been indicated by the dotted lines appearing at the right-hand side of Fig. 5 of the drawings.

It will be noted that the ring portion 11 of the cover 10 occurs between the back of the piston groove and the inner perimeter of the sealing ring, and a working clearance is provided between the portion 11 and the sealing ring. The bottom edge of ring 11 is squarely received on the bottom of the piston groove 15.

It is pointed out that a chief objective of this composite ring assembly is to protect from fluctuating combustion gas pressures the back side of the sealing member, which may be either the cast iron ring shown in Figs. 4 and 5, or the flexion ring shown in Fig. 2. Suitable protection may in some instances involve shutting out of back pressure, in other instances may require only limitation of this back pressure and in still other instances may be satisfied by specific equalization of the back pressure. However, it is necessary to preserve a freely sliding relation of the sealing member in whatever support it may have in its piston so that the ring by its radial expansibility will accurately follow the cylinder contour during reciprocation.

It should be observed that gas pressure acting downwardly on the sealing ring tends to increase its friction with the area where the ring seats in its groove, which tends to reduce the radial expansibility of the ring. In the cover structure illustrated, which does not protect all of the top of the sealing member, this factor must be taken into consideration.

In addition it is required that fluid pressure acting vertically of the cover, will not be transmitted to the sealing ring in sufficient degree to cause pinching of the sealing member between the cover flange and the piston groove as might occur with the flange susceptible to movement by the pressure.

With a sealing member available which has radial expansibility great enough to overcome friction between itself and its groove under combustion pressures, a complete shutting out of pressure from in back of the sealing member may become desirable. It is then necessary to prevent any substantial transmission of fluid

pressure through the cover of the sealing member by constructing the cover member of a strength sufficient to resist any flexing under pressures such as those encountered in a Diesel or gasoline motor.

In Figs. 1 and 6 I have illustrated in cross section proportions of the cover ring which have been found to be of suitable strength to definitely resist combustion pressures referred to, and to avoid transmitting fluid pressure through itself onto the sealing member.

To associate the cover flange 12 with the sealing member so that the latter member may be maintained in a slidably supported position between the flange and the bottom of the piston groove, a small clearance approximating the thickness of an oil film may be provided which will allow the sealing member to move in its support and which when carrying an oil film, as must necessarily be the case, will effectually shut out gases tending to pass therebetween.

It may be desired, due to limited radial expansibility, in the sealing member, to allow pressure to pass between the flange and the sealing member in limited amounts. In this case, the clearance between the cover flange and the sealing member may be slightly increased, and with a relatively small opening present and a short space of time available for pressure to act through the opening, limited pressure only may be transmitted to the back of the ring to overcome friction from vertical pressure.

It is again pointed out that the cover can be made when desired of a sufficiently strong cross section to withstand any flexing and to avoid any transmission of fluid pressure. Also, the cover can be supported in back of the sealing ring on a piston groove and be so closely associated with the top of the sealing member as to completely shut out gas pressure from passing between the flange and the top of the ring. It is further pointed out that complete shutting out of pressure may only be desirable in specific instances and that the cover structure may be modified to pass limited pressures for equalizing purposes.

In the drawings for purposes of illustration of the clearance referred to in the specification, I have shown in Fig. 9 a spacing occurring between the cover member and the top side of the sealing member. It should be understood that the other figures illustrate the sealing member slidably maintained between the cover and base.

The cover 10, through its flange portion 12 and ring portion 11 respectively protects the top and back of the C-type ring, and the seating of the edge 18 prevents gas from entering at the bottom from behind. Engagement of the C-type ring with the cylinder wall effects a seal at the front side.

However, unless closed up, gas pressure may pass through the gap of an open ring and thence in back of it, defeating the purpose of the cover. Additional means must be employed in using the cover with a C-type sealing ring to seal its gap and at the right-hand side of Figs. 4 and 5, it will be noted that the cover ring has been recessed at 21 to leave a peripheral surface 22, which comprises an arc of a circle coincident with the inner periphery of the cylinder. The remainder of the outer periphery of the cover ring comprises an arc of a circle smaller than the cylinder periphery. I have chosen to call the arc portion 22 a lip, and this specific portion of the cover ring will be so referred to hereafter.

The purpose of the lip 22, therefore, is to extend for a substantial distance along the cylinder periphery, sufficiently outwardly to cover over the gap in the C-type ring. By having the lip extend around the periphery of the cylinder a suitable distance, a substantial bearing effect is obtained, tending to maintain the lip 22 uniformly against the cylinder and present rocking of the cover ring relative to the cast iron ring, such as might occur if only a small area lip were presented against the cylinder.

With the extended lip surface for providing an adequate bearing of the lip against the cylinder, some means for maintaining the lip firmly against its bearing is required. As an example of one means, I may use an expander member 23 (Fig. 5), comprising any suitable spring member, as for instance a flat resilient strip of metal. The spring 23 may be disposed in a bent manner between the inner periphery of the cast iron ring and the outer periphery of the ring portion 11, at the side opposite the gap of the C-type ring. This results in the cover member being pressed completely over the cast iron ring at the gap side and the lip becomes more firmly seated against the cylinder. If desired, the ends of the expander member 23 may be more firmly held by notching the inner periphery of the cast iron ring as indicated by numeral 24.

With such an arrangement, the cast iron ring 16 is not only sealed on three sides but its gap also is sealed and fluctuating gas pressures may be completely shut out from between the cover and the cast iron ring or these pressures may be partly excluded or limited in their effect on the back side of the ring. The lip 22 is illustrative of one means of closing the gap. However, I may desire to overcome possible disadvantages of the gap in other ways, as by some other cover portion acting in back of the gap instead of above it and similarly other arrangements for maintaining the lip 22 may be resorted to.

For example, I may locate the expander on the side of the piston adjacent the cast iron ring gap, as contrasted with its being located on the opposite side of the piston in the arrangement just referred to in Fig. 5, and when adjacent the gap the expander may take a position between the piston 14 and the inner periphery of ring portion 11. The effect is substantially the same, other than the ends of the expander member are held by notches formed in the cover ring instead of in the cast iron ring. It should be observed that while the first arrangement offers more protection of the expander from contact with the piston, the latter arrangement is adapted to easier assembly.

As stated above, the preferred form of the cover ring provides for a fixed inner perimeter, or fixed ring portion. In Fig. 7 I have shown means for presenting a split cover ring which can be mounted in sections and the sections thereafter secured together into one complete unit, to constitute a body having a substantially fixed inner perimeter.

In Fig. 7, 28 and 29 refer to two sections of a cover ring comprising flanged portions and ring portions. 30 and 31 indicate strap members, which are adapted to be secured across the ends of the two pieces 28 and 29 against the ring portion by means of pins 32. The strip and pin construction shown in Fig. 8 is intended to be illustrative of various mechanical means of fastening together the ends of a plurality of cover ring

sections and this may be effected equally as well with a cover ring having a lip portion.

In Fig. 9 I have shown a modification of cover ring construction. This construction comprises a cover ring element 10, similar in substantially all respects to the cover ring 11 already shown. In addition thereto, is provided a second base ring element 33 which comprises a member very similar to the element 10, having an inner portion 34 and flange 35. The ring portion 34 is slightly larger in diameter than the ring portion 11 so that it may be snapped or otherwise assembled around the ring portion 11, and the flange 35 extends radially outward to the same distance as the flange portion 12 when the element 35 is snapped around the ring portion 11. The ring portion 34 extends upward to a point just short of the under side of the flange 12 and a space 36 is provided in the same way as before for the cast iron ring to move in.

In the manufacture, handling and assembly of these rings, it may be found desirable to make use of such a base ring element for protective purposes; for instance, the bottom edge of ring 11 which seals against the bottom of the piston groove, is protected from scoring or other roughing or dirt which might affect its sealing ability.

Also, by making the ring portion 34 of a proper dimension as shown in Fig. 9, it is possible to clip the cast iron piston ring 16 between the two cover members, presenting, as a result, a substantially unified piston ring body, which is quickly snapped together and readily adapted to be entered about a piston.

In Fig. 3 I have shown in fragmentary bottom plan view a cover member 10, having a cast iron ring 38 received thereabout. Solidly and radially located through the ring portion of the cover member 10 may be provided a stud or pin 39 extending radially outward a distance comprising a substantial portion of the width of the flange. The ends of the cast iron ring 38 are shouldered at 40 and 41 so that when the two ends are brought together, a space results for receiving the extremity of the stud 39. In operation, the ends are maintained in a compacted position as compressed by the periphery of a cylinder; this positively locks the ring about the stud and at the same time establishes a substantially fixed relation between the cast iron ring and the cover member insofar as the rotation of one relative to the other is concerned. Various other mechanical arrangements may be resorted to.

Fig. 4 shows in plan view a cover ring mounted on a cast iron ring 16 received about a piston 14. In this ring assembly, I have provided means for directly fixing the cover member to one end of the cast iron ring, as one example of which there is illustrated a pin 42 located vertically through the cover member and cast iron ring 16. Preferably the ring 16 will have a reinforced portion 42A to support the pin.

One of the more important advantages resulting from this type of construction is the elimination of expander means for holding the lip portion 22 of the cover ring over against the cylinder wall. The reason for this is that the radial expansibility of the cast iron ring tends to force this ring outwardly against the cylinder, and the lip being fixed to the cast iron ring is necessarily carried out against the cylinder also.

A further advantage in such a construction consists in maintaining the cast iron ring and the cover member substantially as an integral body insofar as reciprocating motion might tend to throw them apart from one another and possibly create some breaking of the sealed condition between the cover and the cast iron ring.

These effects are attained while preserving the usual expansibility of the cast iron ring. Such a pinning means as that shown in Fig. 4 may be incorporated with one or more of the cover members, provided with or without lip surfaces, and formed as continuous bodies, or in sections, or a ring member other than a cast iron C-type ring might be treated in such a manner. Under some conditions, a pin construction such as that shown in Fig. 4 may even be utilized to replace a lip portion on a cover member for the reason that if an annular surface of a cover ring be maintained firmly over against one side of the cast iron ring at this gap, substantial sealing of such a gap may be effected. A particular kind of cover member may also be employed in this connection, whose outer periphery would present a curve eccentric with the curve of its inner diameter or ring portion.

When a packing such as the cover assemblies described is employed, having a part thereof comprising an unbroken annular body of a size less than the overall diameter of the piston head about which it is to be mounted, the piston head, for installation purposes as well as other purposes, may be formed with a portion detachable at the groove to facilitate installation of the unbroken part of the packing.

In Fig. 10 I have shown a piston head ring 14 normally taking a closed position. Resilience for maintaining this closed position may be effected by peening the ring in the well known manner. The ring may be provided with a rib portion 46 adapted to engage in a slot 47 formed in a piston 48 (Fig. 11) so that the bottom edge of the ring 45 becomes the top of the piston groove. This construction is suitable for mounting a ring part of closed perimeter about a piston. A beveled ring might also be employed.

It is intended that this novel piston design may be employed for other purposes than those referred to herein, as for example it may serve as a novel type of piston and a cover member at the same time.

It will be observed that the cover structures illustrated in Figs. 1–11 inclusive are illustrative of a means of protecting the back side of a sealing member. Protection is either effected by shutting out pressure from the back of the ring; or by limiting the pressure allowed to reach the back of the ring; so that while there still may result some undesirable pressure tending to create tapered wear on the cylinder, it is relatively small; or by limiting the pressure, allowed to occur on the back of a ring, to a point at which this pressure substantially balances or equalizes the effect of various friction forces acting on the ring in an opposite direction.

In addition to the cover ring illustrated in Figs. 1, 4, and 5, and the cover ring assembly illustrated in Fig. 9, I may desire to employ certain other cover ring structures, which may function in one of the several ways referred to in the preceding paragraph and some of which may also function differently.

Instead of shutting out or limiting pressure tending to develop on the back of a ring, I may decrease the effective area of the ring on which pressure may occur. I may also provide for increase in certain friction forces in a manner calculated to oppose or offset back pressure.

Fig. 12 illustrates a piston 14 with groove 15, having a sealing member 50. The member 50 has its top side 51 inwardly beveled and supported on the beveled side 51 is a cover ring 52 having its under side correspondingly beveled and adapted to cover a substantial part of the top side of ring 50. The ring 52 is an unbroken annular body and cannot be expanded.

This assembly is illustrative of a means of minimizing or equalizing back pressure on the back of ring 50. It will be observed that the effective area against which pressure can be applied on the back of the ring has been decreased. This tends to decrease total effective pressure urging the ring 50 outwardly against the cylinder wall and hence saves wear. The assembly comprises one radially expansible body which may be either a gap ring or a ring having no gap as described above, and one body which is not radially expansible, the two bodies presenting a modification of zone arrangement.

Fig. 13 illustrates another type of ring assembly which tends to minimize the effective pressure of the ring radially on the cylinder.

In this assembly a ring 55 of closed perimeter is outwardly beveled on both top and bottom sides and sealing rings 56 and 57 are provided to respectively contact these beveled sides. In this modification pressure of these members against the cylinder is again minimized by presenting greatly reduced back surface areas for back pressure to be effective upon. This figure presents a further variation of zone assembly and rings 56 and 57 may be either of the closed or the gap type.

Fig. 14 illustrates a ring assembly somewhat resembling the assembly of Fig. 13. In this modification a reduced back surface of the sealing ring 60 is effected as before. Also, vertical pressure on two cover rings 61 and 62 of closed perimeter tends to build up a friction force more or less variable in proportion to the surface area of the sealing ring contacted by the cover rings, which results in a force available for resisting pressure tending to thrust the sealing ring radially outward. This comprises a still further variation of zone arrangement.

Fig. 15 illustrates another modification of cover ring 66 which is formed with beveled sides 67 and 68 adapted to receive a similarly beveled sealing ring 69. The cover 66 is preferably composed of a spring steel suitable for effecting a connecting spring wall 70. With this structure and proper gap closure, gas pressure can be either completely shut out from behind ring 69 or there may be provided a slight clearance between ring 69 and the beveled side 67, in which event limited amounts of pressure will be allowed in back of ring 69. It should be observed that the ring 69 is not seized or pinched between the flexible cover sides due to the bevel structure since pressure which tends to pinch the cover sides together also tends to force the ring 69 outward. By providing surface areas and clearances of suitable size and proportions, it may be seen that a balance between pressure and friction may be arrived at where substantially all pressure tending to radially urge the ring outward may be equalized in overcoming other resistances as described.

Fig. 16 is a view greatly similar to Fig. 15 illustrating a ring 72, cover portions 73 and 74, and a connecting vertically resilient wall 75 which has been formed in a corrugated manner to develop compactness and a greater range of flexibility in a closed cover structure. The operation and functioning of this ring are substantially the same as that of Fig. 15 with the exception that improved protection may be had with the covers from increased vertical flexibility.

In all of the structures shown it is intended that the pressure value sought will be such as to most adequately allow for the maintenance of an efficient oil film at all times between the sealing member and the cylinder. Also, the structures either as now presented or with slight changes may be desired to be used as oil rings.

In conclusion it is pointed out that a method of maintaining a substantially uniform wall pressure between a sealing member and its cylinder at all points in the cycle of movement of the sealing member is set forth. Various means have been illustrated and described for shutting out, limiting, or equalizing pressures tending to develop on the back side of a ring. Also means are set forth for resisting the effect of such pressures and for minimizing the effect of such pressures. The methods and means referred to are considered effective for the accomplishment of the objectives referred to in this specification.

I claim:

1. A piston ring construction for use in a piston ring groove comprising a sealing ring having a gap therein, a cover member consisting of a solid ring body adapted to seat against the bottom of the said piston groove and shut out gas pressure from the back of the sealing ring when the latter is seated in the groove, said cover member provided with a flange adapted to overlie the sealing ring, said flange being fitted to a side of the sealing ring surface in such relation as to allow the sealing ring to move radially of the cover and to prevent passage of combustion gases between the flange and the sealing ring, and said flange having a radially projecting edge extending along a part only of its circumferential length for the purpose of overlying and sealing the gap of the sealing ring.

2. A piston ring construction for use in a cylinder comprising a solid ring member adapted to seat in a piston ring groove, said solid ring having a radially extending flange, a sealing ring mounted in the ring groove, said sealing ring having one side disposed in spaced-apart relation with respect to the solid ring member, said sealing ring having a further side slidably engaged with the flange of the solid ring member, said solid ring member provided with a radially projecting lip portion, the peripheral edge of said lip portion coinciding with the periphery of the cylinder to seal therewith, said solid ring member at its lip portion having a radial width greater than the radial width of the sealing ring, and means for urging the said lip portion of the solid ring member against the cylinder wall at a point adjacent the ends of the split sealing ring.

3. A piston ring construction for use in a piston and cylinder comprising a sealing ring having a gap therein, an annulus adapted to seat in a piston groove with the sealing ring, said annulus formed with a radially projecting lip portion having a peripheral edge which coincides with the inner periphery of the cylinder, said lip being arranged to extend between the piston ring groove and the cylinder wall at a point adjacent the gap of the sealing ring, and means for yieldably urging the annulus against the cylinder during reciprocation of the piston.

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