April 27, 1965 HANNS-DIETER PASCHKE 3,180,560

SEALING SYSTEM FOR ROTARY MECHANISMS

Filed Aug. 22, 1961 3 Sheets-Sheet 1

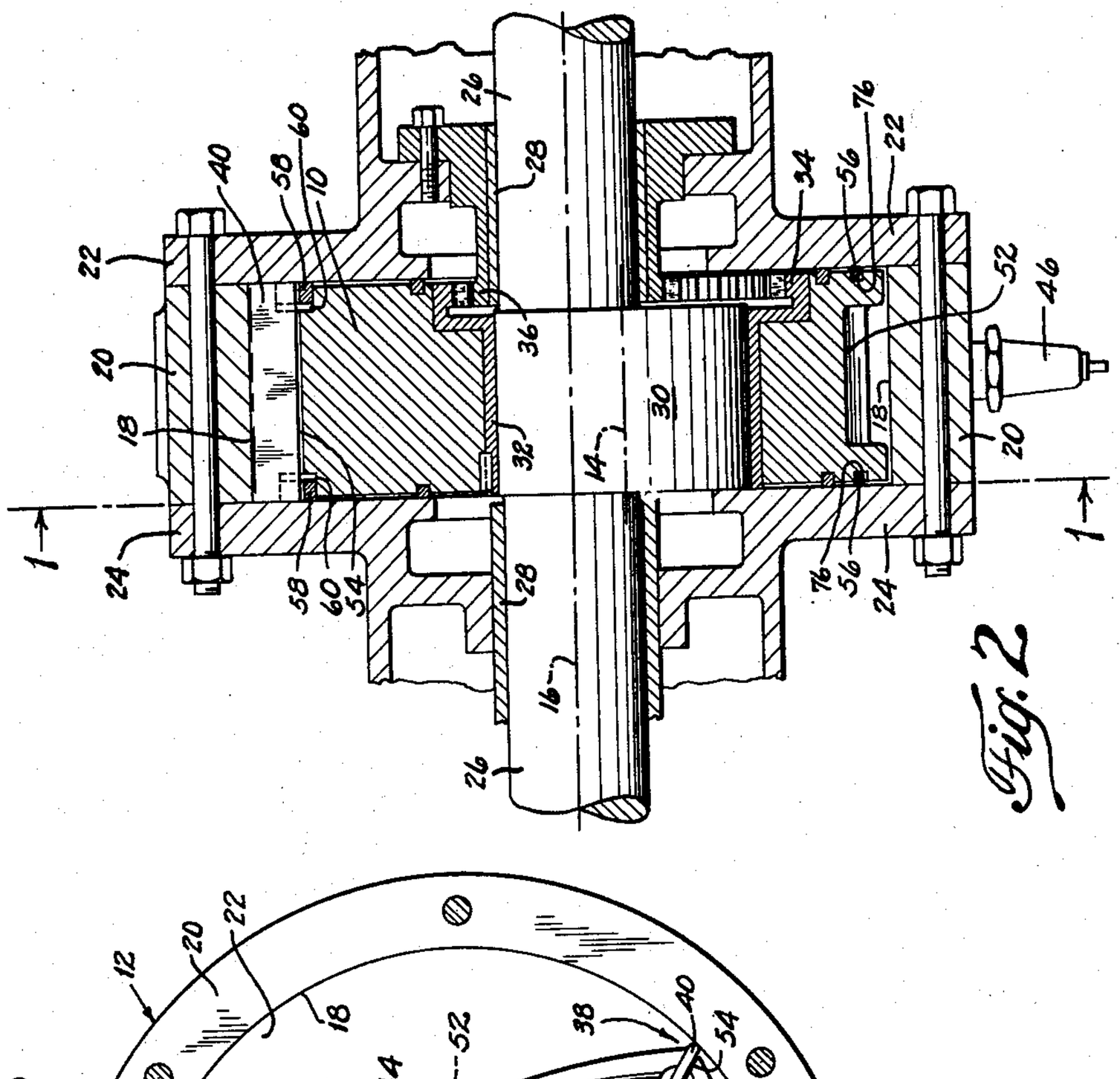

Fig. 1

Fig. 2

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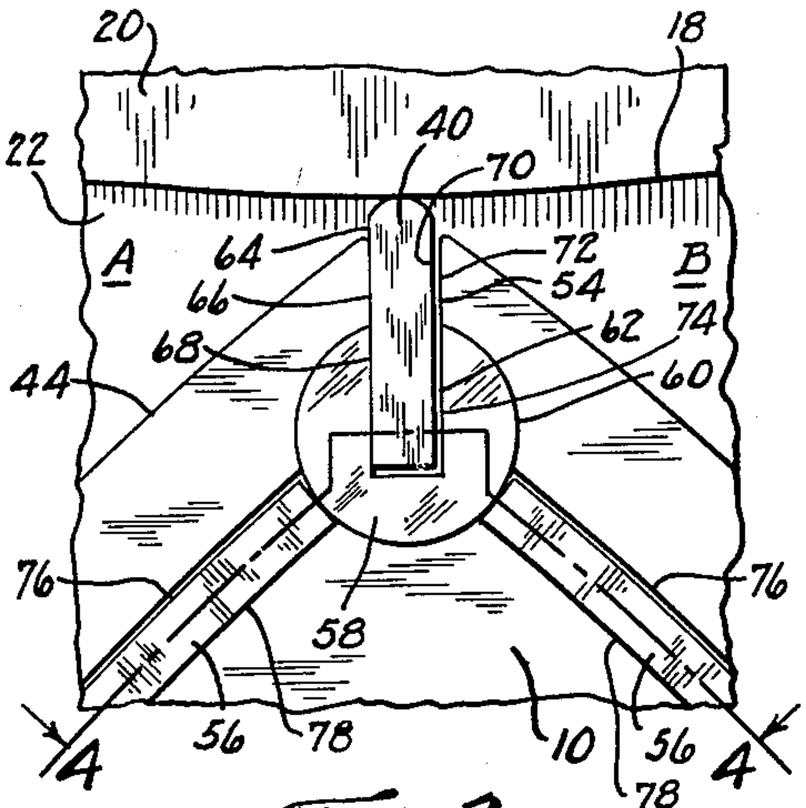

Fig. 3

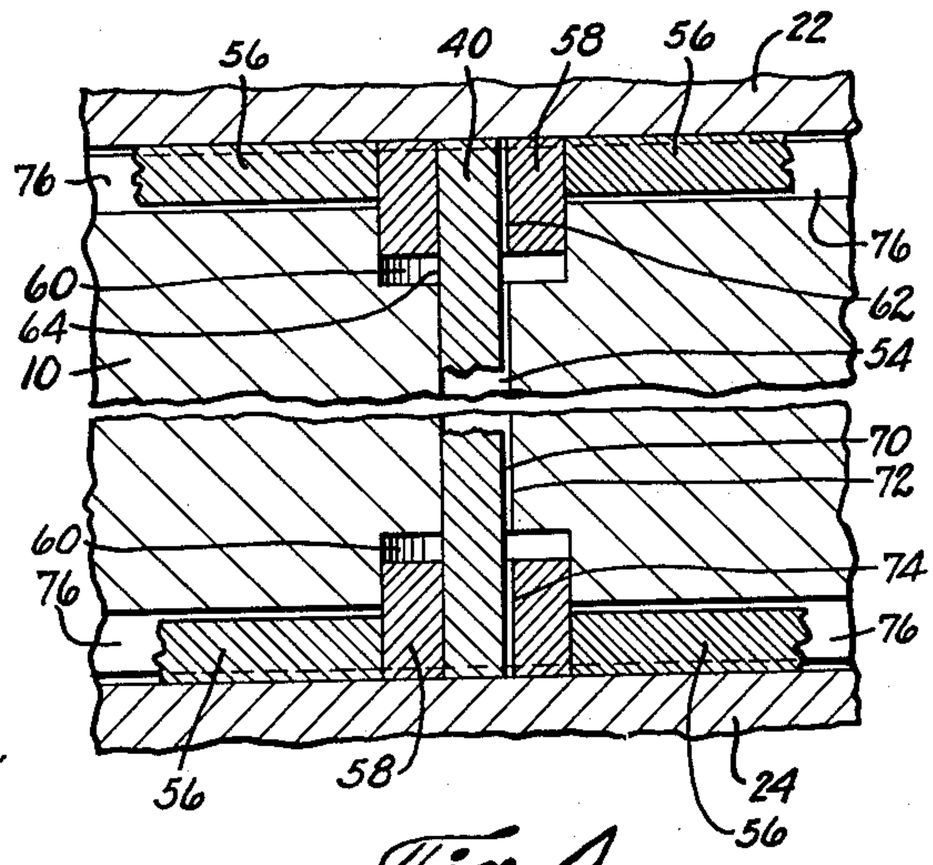

Fig. 4

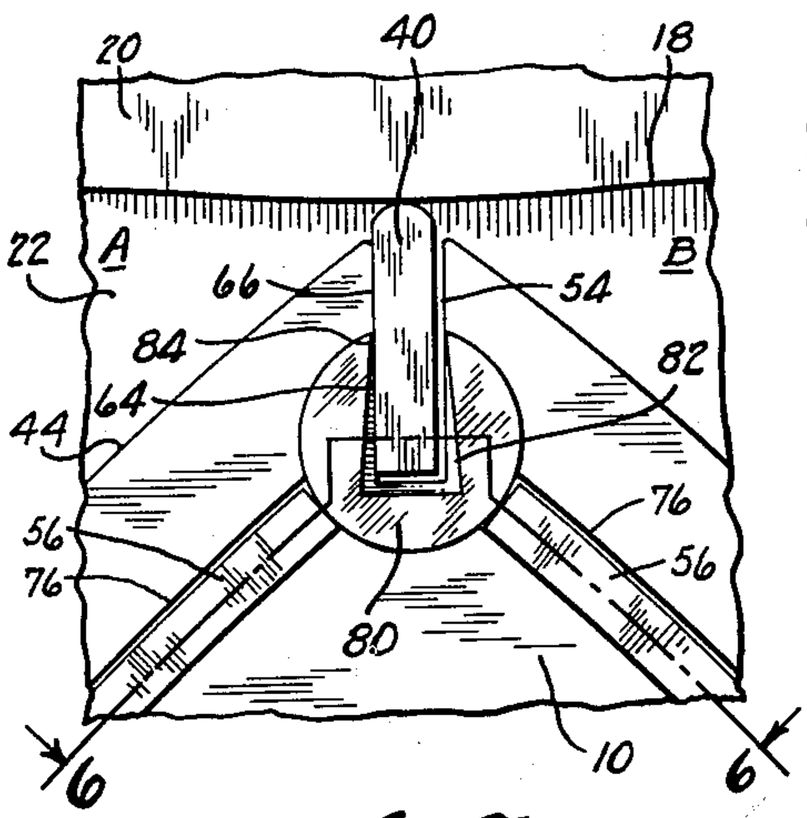

Fig. 5

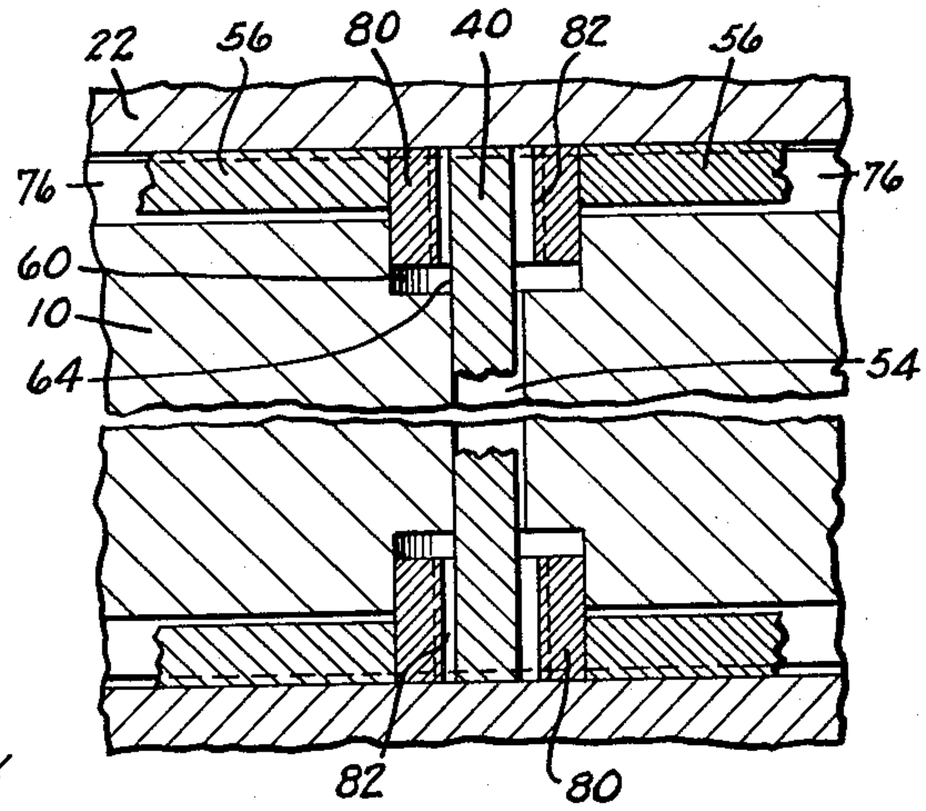

Fig. 6

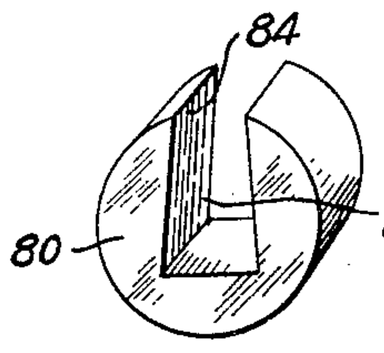

Fig. 7

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SEALING SYSTEM FOR ROTARY MECHANISMS

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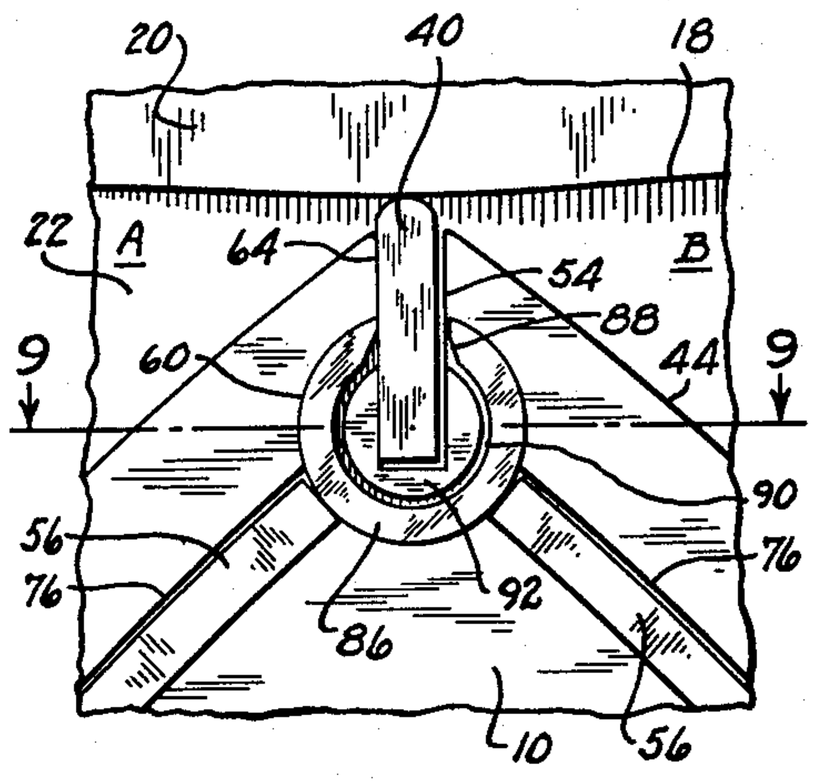

Fig. 8

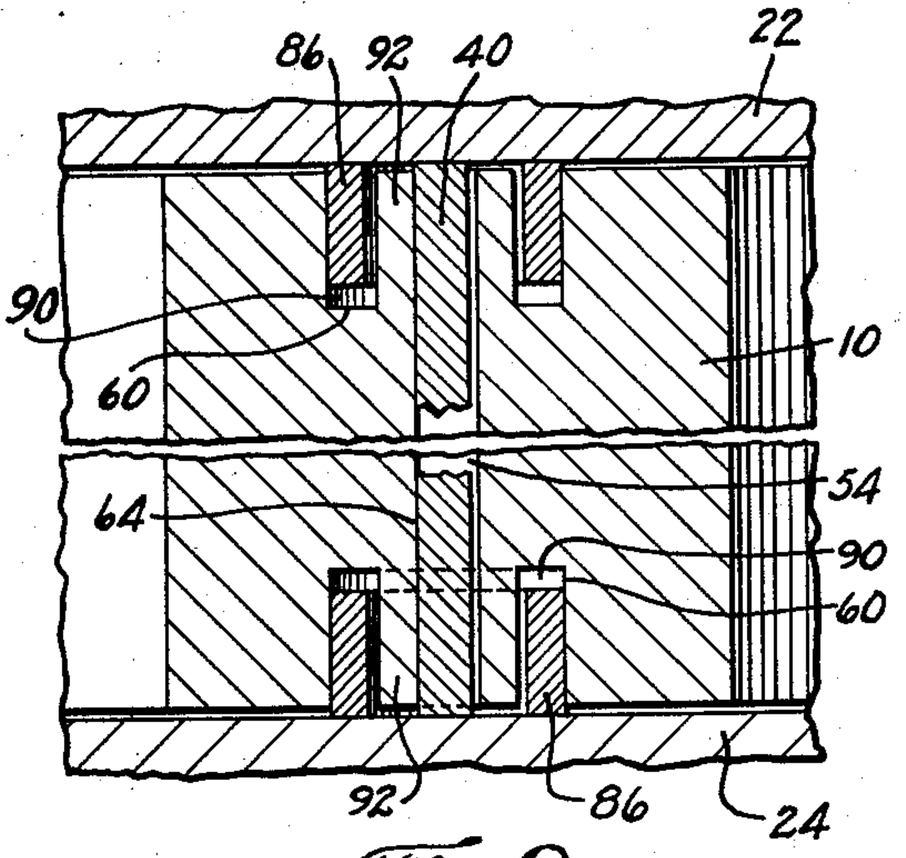

Fig. 9

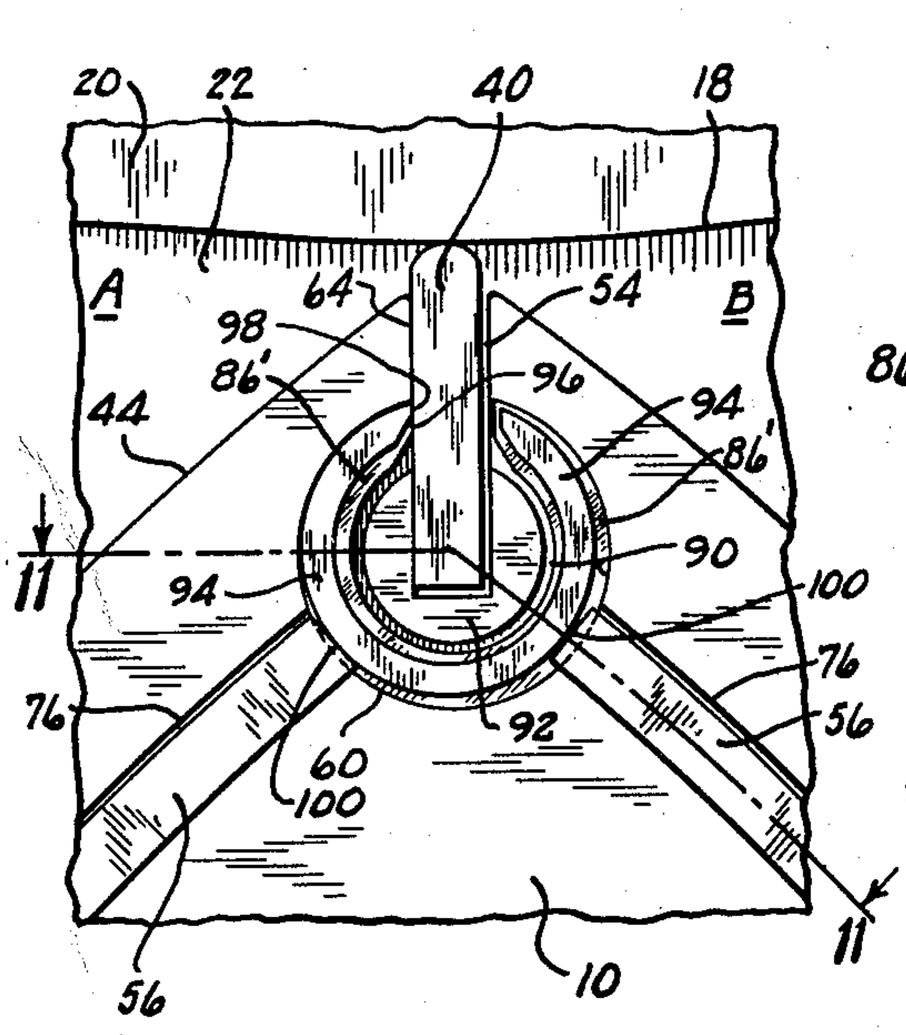

Fig. 10

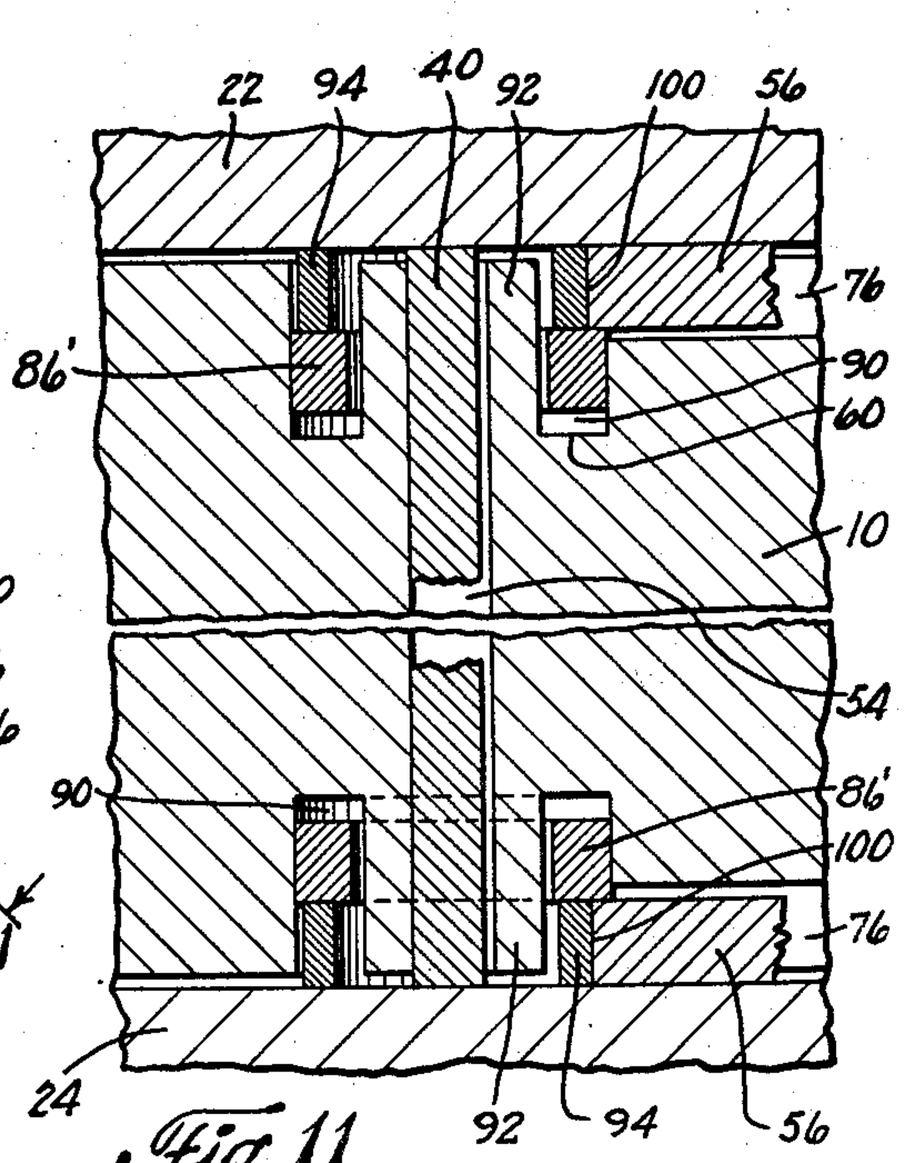

Fig. 11

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SEALING SYSTEM FOR ROTARY MECHANISMS

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Filed Aug. 22, 1961, Ser. No. 134,050
Claims priority, application Germany, Aug. 29, 1960, N 18,828
8 Claims. (Cl. 230—145)

This invention relates to a sealing system for rotary mechanisms, and more particularly to a sealing system for rotary combustion engines that will effectively and efficiently seal the variable volume working chambers of the engine, one from the other, regardless of large differences in pressure existing between adjacent engine chambers to be sealed.

Although this invention is applicable to and useful in almost any type of rotary mechanism that presents a sealing requirement, such as combustion engines, fluid motors, fluid pumps, compressors, and the like, it is particularly useful in rotary combustion engines.

To simplify the explanation of the invention, the description that follows will, for the most part, be restricted to the use of the invention in a rotary combustion engine. It will be apparent from the description, however, that with slight modifications that would be obvious to a person skilled in the art, the invention is equally applicable to other types of rotary mechanisms.

The present invention is particularly useful in rotary combustion engines of the type that is described in detail in Patent No. 2,988,065, issued June 13, 1961, and reference may be made to the disclosure of this patent for a detailed description of such a rotary combustion engine.

This invention relates to a sealing system for such rotary combustion engines and is somewhat similar to that of application Serial No. 761,339, filed September 16, 1958, now Patent No. 3,064,880. These rotary combustion engines comprise an outer body having an axis, axially-spaced end walls and a peripheral wall interconnecting the end walls. The inner surface of the peripheral wall and the end wall form a cavity and the engine also includes a rotor that is mounted within the cavity between its end walls.

The axis of the rotor is eccentric from and parallel to the axis of the cavity of the outer body. The rotor has axially-spaced end faces disposed adjacent to the end walls of the outer body and a plurality of circumferentially-spaced apex portions. The rotor is rotatable relative to the outer body, and its apex portions substantially continuously engage the inner surface of the outer body to form a plurality of working chambers that vary in volume during engine operation, as the result of relative rotation between the rotor and the outer body.

To seal the variable volume working chambers of a rotary combustion engine, one from the other, it has been previously known to provide a slot in each apex portion of the rotor extending in an axial direction over the entire axial width of the rotor and to provide a sealing strip within the slot. Both single and multipart sealing strips have been used for this purpose.

With such sealing strips it has been normal to provide a certain amount of clearance between the side walls of the slot and the sides of the sealing strip and to provide means for urging the sealing strip toward the inner surface of the peripheral wall of the outer body. With this arrangement when a difference in gas pressure exists between two adjacent working chambers, the gas on the high pressure side of the seal can enter the slot and urge the side of the sealing strip against the side wall of the slot on the low pressure side of the sealing strip.

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To seal the clearance existing between the end faces of the rotor and the adjacent end walls of the outer body, sealing elements are provided that extend along the apexes of the rotor, and preferably these sealing elements form a part of the sealing strip itself. The rotor is also provided with end face seals on each of its end faces that extend between adjacent apex portions of the rotor to seal the running clearance between the rotor end faces and the adjacent end walls of the outer body. These end face seals are axially movable and continuously engage the adjacent end walls of the outer body.

The rotor also carries intermediate bodies that are axially movable and are located within recesses in the rotor end faces adjacent each apex portion of the rotor. These intermediate bodies engage the radially inner ends of the sealing elements referred to above, and also engage the adjacent end walls of the outer body. The ends of the end face seal abut against the intermediate body so that each intermediate body acts as a connecting seal that bridges and seals the gap that would otherwise exist between the end of the end face seals and the sealing strips at their point of juncture.

In the embodiment of the sealing system disclosed in application (Serial No. 761,339, filed September 16, 1958, now Patent No. 3,064,880), the intermediate body is arranged so that it has an axially movable sliding fit within a recess in the rotor provided for it. The intermediate body has a groove within which it receives the radial inner end of the sealing element. In this embodiment of the sealing system that is disclosed in that application, to obtain adequate and effective sealing it is necessary that the sealing element engage the side wall of its slot in the rotor as well as the side wall of the groove in the intermediate body. To achieve engagement of the sealing element with both side walls relatively narrow manufacturing tolerances are required.

In view of the desire to eliminate narrow manufacturing tolerances wherever possible, it is a primary object of this invention to provide a novel sealing system having parts that can be manufactured with larger tolerances than was previously possible. This desideradum is accomplished by having the sealing element, preferably the sealing strip itself, engage the intermediate body along only a small surface. This engaging surface can be a line, for example, in embodiments in which the intermediate body has a groove for receiving the sealing element and in which this groove is enlarged radially inwardly.

It is thus another object of this invention to provide a novel sealing system in which the engaging surface between the intermediate body and the sealing element is a line only. When the groove in the intermediate body for receiving the sealing element is enlarged radially inwardly, the sealing element engages only the radially outer edge of the groove and can always easily be brought into alignment with the side wall of the slot in the apex portion of the rotor that carries the sealing strip.

The same desired effect of having the engaging surface comprise a line may also be obtained when the intermediate body comprises a slotted annulus in which the slot of the annulus receives the sealing element. In such an embodiment, if the intermediate body is formed as a spreader body through suitable dimensioning of the slotted annulus, relatively large tolerances can be permitted, because such an intermediate body may be spread by internal tension or gas pressure from one of the adjacent working chambers to keep it in sealing contact with the inner surface of its recess in the rotor.

A problem that has been encountered in the use of previously known sealing systems in rotary combustion engines is that sealing engagement between the end face seals and the intermediate body can be disrupted by changing conditions of operation. It has been somewhat

difficult to obtain a reliable sealing contact of both ends of an end face seal with the adjacent intermediate bodies, since the end face seals preferably have a strip-shaped configuration and are subject to having their position relative to the intermediate body changed during operation under the influence of centrifugal forces, gas pressures, and thermal stresses. Accordingly, it is an object of this invention to provide a novel sealing system that will ensure adequate sealing engagement between the ends of the end face seals and the intermediate bodies regardless of changes in operating conditions of the engine. A preferred embodiment for achieving the foregoing object provides a sealing system that includes a sealing body positioned between each intermediate body and the end wall of the outer body. This sealing body is located within a recess in the rotor and is in the form of a slotted annulus which is adapted to receive the radially inner and axially outer end of the sealing element within its slot. The ends of the end face seals abut in sealing engagement against the outer surface of the sealing body.

The sealing body is under the action of gas pressure and is able to engage the sealing element as well as the ends of the adjacent end face seals as it is arranged with clearance within its recess. When the sealing body is made in the shape of a slotted annulus that is spread by internal tension, or placed under stress when inserted in it recess, or sperad by gas pressure, it automatically maintains itself in sealing contact or engagement with the ends of the face seals.

Gas pressure acts also behind the intermediate body and presses this body toward the sealing body to urge the sealing body against the adjacent end wall of the outer body. With such a configuration and arrangement an effective seal without gaps is obtained. Preferably, the intermediate body that is used in combination with the sealing body has one of the previously described desirable shapes, but it is within the scope of this invention to use the sealing body in combination with an intermediate body of previously known configuration, since the sealing body itself achieves the desired sealing in providing continuous sealing engagement with the ends of the end face seals, and the advantages of a sealing system without gaps providing sealing interconnection between the sealing strip and the end face seals is obtained.

To provide a completely closed sealing system without gaps, it is desirable that the sealing body and the end face seals have the same axial width and to arrange the sealing body and end face seals so that the axially outer face of the intermediate body engages the juncture between the sealing body and the end face seals. This arrangement ensures that the intermediate body bridges the joint abutment of the end face seals with the sealing body.

Additional objects of this invention are to provide a novel sealing system for rotary mechanisms that ensures a closed sealing system without gaps between its components at their points of juncture and in which all of the sealing components are in mutual sealing engagement with one another. This invention also provides a novel sealing system that makes use of gas pressure within the rotary mechanism to re-enforce the inherent sealing capabilities of the system and prevent gaps from occurring between the components of the system during operation.

A further object of this invention is to provide a novel sealing system for a rotary mechanism in which some of the components of the system are under internal tension that serves to ensure sealing engagement between components of the system at their points of juncture.

To achieve the foregoing objects, and in accordance with its purpose, this invention provides means which, as embodied and broadly described, comprise a novel sealing system for sealing the working chambers of a rotary mechanism, one from the other, by achieving a combination of sealing components that cooperate together to provide

efficient and effective sealing engagement with each other at their points of juncture regardless of varying conditions of operation of the mechanism. Preferably, this combination comprises an intermediate body between the ends of the end face seals and the radially inner end of the sealing elements in which the surface engagement between the intermediate body and the side wall of the sealing element is achieved by a line contact and in which preferably, a sealing body is provided axially outward from the intermediate body. The sealing body is in sealing engagement with the ends of the end face seals where these abut against the sealing body and the sealing body is under internal tension which enforces this abutting contact with the ends of the end face seals and may also be under gas pressure to achieve the same end. This novel sealing system ensures effective sealing through the mutual cooperation and interaction of the components that comprise it.

Additional objects and advantages of the invention will be set forth in part in the description that follows and in part will be obvious from the description or may be learned by practice of the invention, the objects and advantages being realized and attained by means of the instrumentalities and combinations particularly pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements shown and described.

As accompanying drawings that are incorporated in and constitute a part of this specification illustrate various embodiments of the invention and together with the description serve to explain the principles of the invention.

Of the drawings:

FIG. 1 is a side elevation view of one type of rotary combustion engine with which the present invention may be used. This view shows the engine as it appears with one end wall of the outer body removed and is taken along the line 1—1 of FIG. 2;

FIG. 2 is a central vertical section taken along the line 2—2 of FIG. 1;

FIG. 3 is a sectional view of the embodiment of a sealing system that is somewhat similar to that disclosed in application 761,339, now Patent No. 3,064,880. FIG. 3 shows this embodiment as it appears when forming the seal between chambers A and B of FIG. 1 with the rotor in the position shown in FIG. 1. The remaining figures of the drawings that show embodiments of this invention also show these embodiments in the form in which they would appear when providing sealing between chamber A and chamber B with the rotor in the position as shown in FIG. 1;

FIG. 4 is a sectional view taken along the line 4—4 of FIG. 3;

FIG. 5 is a sectional view of one embodiment of the novel sealing system forming this invention;

FIG. 6 is a sectional view taken along the line 6—6 of FIG. 5;

FIG. 7 is a perspective view of the component forming the intermediate body of the sealing system depicted in FIG. 5;

FIG. 8 is a sectional view of a sealing system forming a second embodiment of this invention;

FIG. 9 is a sectional view taken along the line 9—9 of FIG. 8;

FIG. 10 is a sectional view of a sealing system forming a third embodiment of this invention; and

FIG. 11 is a sectional view taken along the line 11—11 of FIG. 10.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory but are not restrictive of the invention.

Reference will now be made in detail to the present preferred embodiment of the invention, an example of which is illustrated in the accompanying drawings.

In accordance with the invention, a rotary combustion engine and novel sealing system for sealing the working chambers of such an engine, one from the other, are provided. As embodied and as shown in FIGS. 1 and 2, the present preferred embodiment of the invention includes a rotary combustion engine comprising a generally triangular rotor 10 having arcuate sides which is eccentrically supported for rotation within an outer body 12.

Although in the illustrative embodiment shown in the drawings the outer body 12 is fixed or stationary, a practical and useful form of the invention may be constructed in which both the outer body and rotor are rotary; in the latter form of the invention, the power shaft is driven directly by rotation of the outer body, and the inner body or rotor rotates relative to the outer body.

As shown in FIGS. 1 and 2, and as here preferably embodied, the rotor 10 rotates on an axis 14 that is eccentric from and parallel to the axis 16 of the curved inner surface 18 of the outer body 12. The distance between the axes 14 and 16 is equal to the effective eccentricity of the engine and is designated *e* in the drawings. The curved inner surface 18 of the outer body 12 has basically the form of an epitrochoid in geometric shape and includes two arched lobe-defining portions or lobes.

As embodied, the generally triangular shape of the rotor 10 corresponds in its configuration to the "inner envelope" or the maximum profile of the rotor that will permit interference-free rotation of the rotor 10 within the outer body 12.

In the form of the invention illustrated, the outer body 12 comprises a peripheral wall 20 that has for its inner surface the curved inner surface 18, and a pair of axially-spaced end walls 22 and 24 that are disposed on opposite sides of the peripheral wall 20.

The end walls 22 and 24 support a shaft 26, the geometric center of which is coincident with the axis 16 of the outer body 12. This shaft 26 is supported for rotation by the end walls 22 and 24 on bearings 28. A shaft eccentric 30 is rigidly attached to or forms an integral part of the shaft 26, and the rotor 10 is supported for rotation or rotatably mounted on the shaft eccentric 30 by the rotor bearing 32.

As shown in FIGS. 1 and 2, an internally-toothed or ring gear 34 is rigidly attached to one end face of the rotor 10. The ring gear 34 is in mesh with and externally-toothed gear or pinion 36 that is rigidly attached to the stationary end wall 22 of the outer body 12.

From this construction, it may be observed that the gearing 34 and 36 does not drive or impart torque to the shaft 26 but serves to index or register the position of the rotor 10 with respect to the outer body 12 and to keep the rotor in phase as the rotor rotates relative to the outer body. The gearing also enforces the desired speed ratio between the rotor and the shaft and removes the positioning load that would otherwise be placed upon the apex portions of the rotor 10.

As shown most clearly in FIG. 1, the rotor 10 includes three apex portions 38 that carry radially movable sealing strips 40. The sealing strips 40 are in substantially continuous gas-sealing engagement with the inner surface 18 of the outer body 12 as the rotor 10 rotates within and relative to the outer body 12.

By means of the rotation of the rotor 10 relative to the outer body 12, three variable volume working chambers A, B, and C are formed between the peripheral working faces 44 of the rotor 10 and the inner surface 18 of the outer body 12. As embodied in FIG. 2, the rotation of the rotor relative to the outer body is counterclockwise and is so indicated by an arrow.

A spark plug 46 is mounted in the peripheral wall 20 of the outer body 12, and at the appropriate time in the engine cycle, the spark plug 46 provides ignition for a compressed combustible mixture which, on expansion, drives the rotor in the direction of the arrow. The rotary combustion engine may also be operated as a diesel, and

when it is operated as a diesel, the spark plug 46 is not required, since ignition of the fuel is initiated by the temperature reached through high compression of the working air.

Also as shown in FIG. 1, one lobe of the epitrochoidal inner surface 18 is provided with an intake port 48 and the other lobe is provided with an exhaust port 50. As the rotor 10 rotates, a fresh charge is drawn into the appropriate chamber (chamber A as shown in FIG. 1) through the intake port 48. This charge is then successively compressed, ignited, expanded and finally exhausted through the exhaust port 50.

All four successive phases of the engine cycle: intake, compression, expansion, and exhaust, take place within each one of the variable volume working chambers A, B, and C, each time the rotor 10 completes one revolution within the outer body.

The working faces 44 of the rotor 10 are provided with cut-out portions or channels 52 that permit combustion gases to pass freely from one lobe of the epitrochoidal inner surface 18 to the other lobe when the rotor is at or near the dead center of maximum compression position. Also, a desired compression ratio for the engine may be attained by appropriate proportioning of the volume of the channels 52.

In the present preferred embodiment, the gear ratio between the gearing 34 and 36 is 3:2 so that each time the rotor 10 completes one revolution about its own axis 14, the shaft 26 rotates three times about its axis 16. The gearing thus enforces a speed ratio between the shaft 26 and the rotor 10 of 3:1.

As shown in FIGS. 1 and 2, sealing strips 40 are carried with clearance in each slot 54, and these sealing strips 40 continuously slide on the inner surface 18 of the outer body 12 and thus seal the three working chambers A, B, and C from one another in a peripheral direction. The rotor 10 is also provided in each of its end faces with end face seals 56 that are axially movable and that are connected with sealing strips 40 by axially-movable intermediate bodies 58. The three different types of seals, the sealing strips 40, the end face seals 56, and the intermediate bodies 58, thus serve to comprise a complete sealing system to seal each of the chambers A, B, and C one from the other.

An embodiment similar to that of Patent No. 3,064,880 is illustrated in FIGS. 3 and 4. As shown most clearly in FIG. 3, an annular recess 60 is provided beneath and surrounding the radially inner end of the slot 54. This annular recess 60 accommodates an axially-movable intermediate body 58 with a sliding fit.

The intermediate body 58, as shown in FIG. 3, includes a groove 62 that receives the radially inner and axially outer end of the sealing strip 40. For proper fitting of the parts, and as can be seen in FIG. 3, the groove 62 must be in exact alignment with the slot 54 so that the side face 64 of the sealing strip 40 will be in contact with both the side wall 66 of the slot 54 and the side wall 68 of the groove 62, when the higher pressure is in chamber B. If the pressure in chamber A should be higher, however, the side face 70 of the sealing strip 40 must be in sealing contact with both the side wall 72 of the slot and side wall 74 of the groove 62.

Also as shown in FIGS. 3 and 4, strip-shaped end face seals 56 are carried within end face grooves 76 on each end face of the rotor 10. The end face seals 56 are axially movable within the grooves 76 and are in joining abutment against the intermediate body 58. If the gas pressure in chamber B is higher than the pressure in chamber A, as shown in FIG. 3, the sealing strip 40 is urged toward the walls 66 and 68. Also the gas pressure acts underneath the sealing strip 40 to urge it radially outward towards the inner surface 18 of the outer body 12 to hold the sealing strip 40 in sealing engagement with the inner surface 18.

Further, the gas pressure additionally acts within the

annular recess 60 behind or axially inward from the intermediate body 58 and urges it axially outward into sealing engagement with the inner surface of the end walls 22 and 24. Finally, the gas pressure urges the end face seals 56 toward the radially inner side wall 78 of the end face grooves 76 and axially outward into sealing engagement with the inner walls of the outer body end walls 22 and 24. These latter functions of the gas pressure are best illustrated in FIG. 4.

From the foregoing description, it is apparent that the embodiment illustrated in FIGS. 3 and 4 is one in which the intermediate body 58 accomplishes a tight connection between the sealing strip 40 and the end face seals 56. This embodiment, when made to proper tolerances, effectively seals the slot 54 and end face groove 76 from each other, but this desideratum is achieved through the aid of at least two snug fits. These snug fits, of course, render the assembly and exchange of the components of this sealing system difficult.

In accordance with the present invention, a novel sealing system is provided for sealing the working chambers, one from the other. As here preferably embodied, and as shown in one embodiment in FIGS. 5 and 6, the intermediate body 80 is provided with a groove 82 that becomes progressively larger in width in a radially inward direction. This configuration provides a wedge-shaped groove for the groove 82, and because of this configuration of the groove 82, the sealing strip 40 meets the intermediate body 80 in sealing engagement along a line contact, namely, the line formed by the outer edge 84 of the groove 82 meeting the side face 64 of the sealing strip 40.

From a study of FIGS. 5 and 6, it is apparent that the intermediate body 80 can adjust itself under gas pressure in such a manner that the outer edge 84 of the groove 82 will always be in alignment with the associated side wall 66 of the slot 54.

A perspective view of the intermediate body 80 is shown in FIG. 7. This view gives a ready grasp of the exact configuration of the intermediate body 80 and its wedge-shaped groove 82.

Other than providing sealing engagement by a line contact between the outer edge 84 of the wedge-shaped groove 82 and the side face 64 of the sealing strip 40, operation of the embodiment of FIGS. 5 and 6 is not different from the operation of the embodiment of FIGS. 3 and 4.

In accordance with this invention, a second embodiment of the novel sealing system for sealing the chambers of a rotary mechanism, one from the other, is provided. As here preferably embodied, this second embodiment is illustrated in FIGS. 8 and 9 and comprises for the intermediate body of the sealing system a slotted annulus 86. The slot 88 of the annulus 86 receives the radially inner and axially outer end of the sealing strip 40. The annulus 86 is inserted in an annular chamber 90 that is formed from the inner surface of the recess 60 and the outer surface of a projecting boss or insert 92 that is concentrically arranged within the recess 60.

The purpose of the boss 92 is to diminish the volume of the recess 60 underneath the sealing strip 40 as far as practicable, because otherwise this volume would be too large to respond quickly enough to changes of pressure in the adjacent working chambers A and B.

As in the embodiment of FIGS. 5, 6, 7, the sealing strip 40 in this embodiment also engages the slotted annulus 86 only along a line contact or relatively small surface that can adjust itself without difficulty to exact alignment with the associated side wall 64 of the slot 54 responsive to gas pressure. Also, the slotted annulus 86 provides the advantage of not requiring its external surface to be dimensioned to yield a sliding fit against the inner surface of the recess 60, because it can be dimensioned in a manner so that its own internal tension or gas pressure will spread it so that it comes into sealing engagement with the inner surface of the recess 60. In this embodiment, the end face seals 56 are also in joining abutment against the annulus 86.

In the embodiments of the present invention illustrated in FIGS. 5 through 9, the junction of the end face seals 56 with the intermediate bodies 58 and 86, respectively, is accomplished by joint abutment. Unless a snug fit is provided for this joint abutment, it is difficult to insure that both ends of each end face seal 56 will maintain the desired joint abutment for sealing engagement under all operating conditions. The end face seals 56 may change their position with respect to the intermediate bodies 58 and 86 because of the influence of centrifugal forces, gas pressures, or thermal stresses. Also, as operating temperatures vary, the length of the end face seals 56 will also vary and may deleteriously affect the quality of the sealing engagement at the joint abutment.

In accordance with the present invention, a third embodiment of a novel sealing system for sealing the working chambers or rotary mechanism, one from the other, is provided. This third embodiment provides a solution to the problem of ensuring a joint abutment between the intermediate body and the end face seal.

As here preferably embodied, and as shown in FIGS. 10 and 11, a slotted annulus 86′ is provided that is the same as the slotted annulus 86 in its basic configuration. Axially outward from the slotted annulus 86′, there is provided a sealing body 94 in the form of a second slotted annulus, and this sealing body is arranged with clearance within the annular chamber 90.

If the higher pressure, as shown in FIG. 10, is in chamber B, both the slotted annulus 86′ and the sealing body 94 will be turned by gas pressure in a clockwise direction until the faces 96 and 98 of the slotted annulus 86′, and sealing body 94, respectively, are in sealing engagement with the sealing strip 40. At the same time, the external surface of the sealing body 94 will be in contact with the ends of the end face seals 56.

The abutment of the end face seal against the external surface of the sealing body 94 can be enhanced in effectiveness by spreading of the sealing body 94 under the influence of gas pressure. The gas pressure also enters the annular chamber 90 axially inward behind the slotted annulus 86′ and urges it axially outward against the sealing body 94 until the sealing body is in sealing engagement with the adjacent inner surface of the end wall of the outer body.

As shown in FIG. 11, the sealing body 94 and the end face seals 56 have the same axial width, and the axially outer face of the slotted annulus 86′ is located so that it engages the axially inner face of the sealing body 94 and bridges the joint abutment 100 between the sealing body 94 and the end face seals 56. A combination is thus created that ensures a tight sealing connection between the sealing strip 40 and the end face seals 56 as well as a sealing of the slot 54 and the end face groove 76 from each other. The combination of the components of this novel sealing system provide through the interaction of the sealing body 94 and slotted annulus 86′ a sealing connection that is not influenced by thermal expansion or contraction of the end face seals 56.

In addition, this latter embodiment of the present invention permits a free assembly, interchange, and exchange of all sealing parts without the necessity of machining the parts to narrow tolerances, because the slotted annulus 86′ and the sealing body 94 can both adapt themselves to the exact sealing requirements of the moment through the influence of gas pressure and their own resiliency.

This invention in its broader aspects is not limited to the specific mechanisms shown and described, but also includes within the scope of the accompanying claims any departures made from such mechanisms that do not sacrifice its chief advantages.

What is claimed is:

1. In combination with a rotary mechanism, comprising a hollow outer body, having an axis, axially-spaced end walls, and a peripheral wall interconnecting the end walls, and a rotor mounted within the outer body and rotatable relative to the outer body, the rotor having axially-spaced end faces adjacent the end walls of the outer body and a plurality of circumferentially-spaced apex portions in sealing engagement with the inner surface of the peripheral wall to form a plurality of working chambers between the rotor and the inner surface of the outer body that vary in volume upon relative rotation of the rotor within the outer body; the improvement of a sealing system comprising each apex portion of the rotor having an axially-extending slot, a radially movable sealing strip carried in each slot, and in sealing engagement with the inner surface of the peripheral wall of the outer body, the end faces of the rotor having grooves extending between apex portions, axially movable end face seals carried in each end face groove, each end face of the rotor also having recesses adjacent each apex portion, axially movable intermediate bodies carried in each recess of the rotor and in sealing engagement with the adjacent end wall of the outer body, the end face seals extending between adjacent intermediate bodies and having their ends in joining abument against the intermediate bodies, each intermediate body having a cavity therein receiving the radially inward edge of the sealing strip, said cavity being larger at its radially inward portion than at the peripheral portion, said intermediate body having substantially line-contact at the peripheral portion of the cavity with the sealing strip.

2. The invention as defined in claim 1, in which the cavity in the intermediate body is wedge-shaped.

3. The invention as defined in claim 1, in which the intermediate body is formed as a spreader body that engages the inner surface of the recess.

4. The invention as defined in claim 1, in which the intermediate body comprises a slotted annulus, and in which the slot serves to accommodate the sealing strip.

5. The invention as defined in claim 4, in which the recess in the end face of the rotor that accommodates the slotted annulus is annular in shape.

6. The invention as defined in claim 1, in which the intermediate body comprises a first part and a second part, the first part of the intermediate body being a sealing body, and the second part of the intermediate body being the intermediate body proper, and in which the sealing body is positioned axially outward from the intermediate body proper and is carried in the recess in the rotor with clearance, the sealing body also having a groove in which it receives the radially inner and axially outer end of the sealing strip, the sealing body being in abutting engagement with the ends of the end face seals.

7. The invention as defined in claim 6, in which the sealing body comprises a slotted annulus, the slotted annulus being under internal tension when it is carried in the recess in the rotor, and also arranged so that it is subject to movement within the recess responsive to gas pressure, whereby under the influence of its internal tension and gas pressure the slotted annulus may be urged into contact with the adjacent ends of the end face seals.

8. The invention as defined in claim 6, in which the sealing body and the end face seals have the same axial width, and in which the end face of the intermediate body proper engages the sealing body and bridges the joint abutment between the end face seals and the sealing body.

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