Aug. 3, 1965 R. E. ALBERTI ETAL 3,198,323

PACKAGE OF ANNULAR SEALS

Filed Feb. 9, 1962 2 Sheets-Sheet 1

Fig. 1.

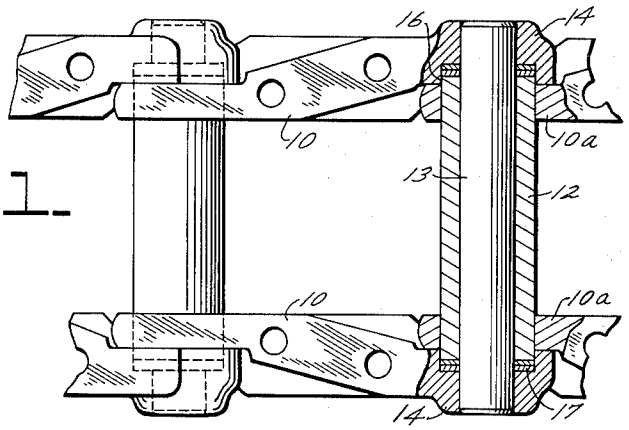


Fig. 2.

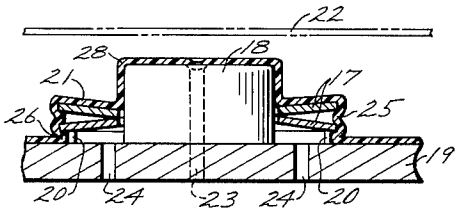


Fig. 3.

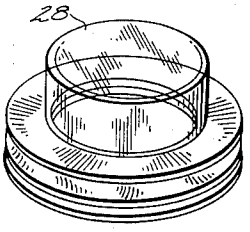
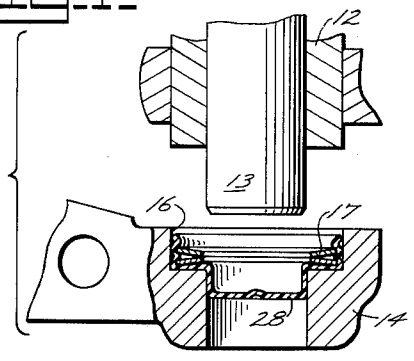


Fig. 4.



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Filed Feb. 9, 1962 2 Sheets-Sheet 2

Fig. 5.

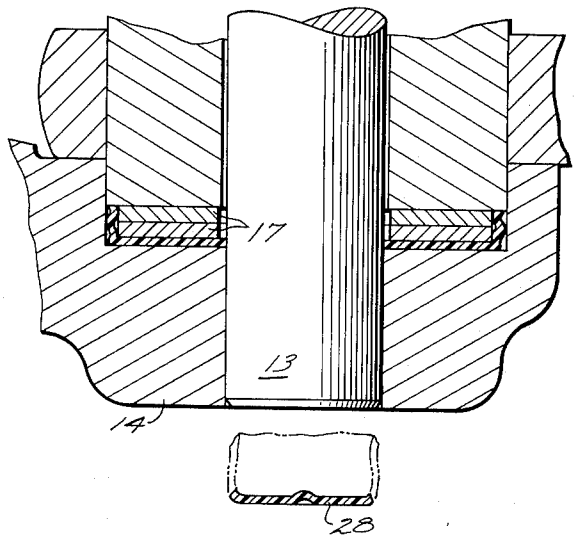
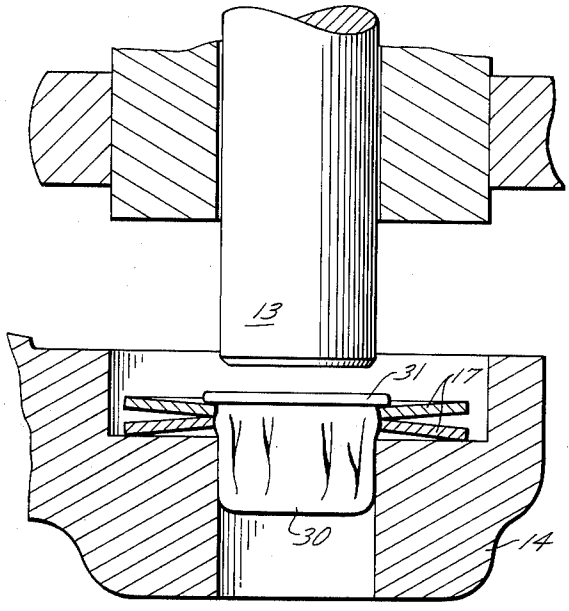


Fig. 6.



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PACKAGE OF ANNULAR SEALS

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This invention relates to means for orienting and assembling seal parts and particularly to means for retaining two annular seal parts in proper position relative to each other and for temporarily retaining them in a seal housing or recess pending the assembly of parts which permanently retain them in place. While the invention may find usefulness in many environments, it was designed particularly for use in connection with the track links of track-type tractors and will be so described in the present application.

The particular type of seal to which the invention applies is described in our assignee's co-pending application for United States Letters Patent of Ralph W. Yocum, Serial No. 98,653, now Patent No. 3,110,097 entitled "Packaging and Assembling Means and Method for Seals." In the method of said co-pending application, the seal parts which are in the form of two frusto-conical annular seal members are placed together in their position of use and included in a paper and plastic blister package having a margin of the paper and plastic material slightly larger than an annular recess in which the seals are to be used. Thus when the packaged seals are placed in the recess, the annular margin is distorted and is in frictional engagement with the annular wall of the recess temporarily retaining them in place until the track links are finally assembled. While the invention of said application has proven very useful in connection with certain methods of track assembly, it is not entirely satisfactory in other methods. For example, there are now in existence automatic machines for assembling track chains consisting of automatic presses and conveyors and the seal rings or seal ring packages must be installed in the recess in the track links a considerable distance and time prior to the pin pressing operation which completes the track joint. During travel of the link through that distance, the track chain assembly is subjected to vibration inherent in the operation of the machine and as a result the seal ring passages are sometimes caused to shake out of place before occurrence of the operation which permanently retains them.

It is, therefore, the object of the present invention to provide a seal ring package or means for orienting and assembling seal rings into their useful position which is effective to hold them firmly in their assembled position until they are permanently secured therein.

Further and more specific objects and advantages of the invention and the manner in which it is carried into practice are made apparent in the following specification by reference to the accompanying drawings.

In the drawings:

FIG. 1 is a fragmentary plan view with parts in section of a part of the track assembly of a track-type tractor including seals installed in accordance with the present invention;

FIG. 2 is a central sectional view of a pair of seal rings embraced by packaging material and illustrating the manner in which packaging is accomplished;

FIG. 3 is a perspective view of a complete package;

FIG. 4 is a fragmentary sectional view showing a package of seal rings inserted in the recess which they occupy in use and showing a track pin and bushing in readiness for being assembled into place;

FIG. 5 is a fragmentary view of the same parts shown in FIG. 4 after the track pin and bushing have been brought into place; and

FIG. 6 is a fragmentary sectional view illustrating a modified form of the invention.

FIG. 1 shows a portion of the endless track mechanism for a track-type tractor and shows a pair of track links 10 with one end of each pressed onto a bushing 12. The bushing has an axial bore for the reception of a track pin 13 which forms a pivotal connection with the overlapping ends of an adjacent pair of track links, portions of which are shown at 10a. The overlapping ends of all of the links are provided with bosses 14 which are bored for reception of the extending ends of the pins 13 which are pressed into place. The fit between the bushing 12 and pin 13 is sufficiently loose to permit hinging of the connected track parts as the track passes around the driving sprockets and idler wheels of a tractor. The inner face of each link adjacent the boss 14 is provided with an annular recess 16 for reception of a combined seal and thrust means in the form of a pair of frusto-conical spring washers 17 which serve in the manner fully set forth in our assignee's co-pending application of Fred E. Simpson et al., Serial No. 84,676, filed January 24, 1961 for "Combined Seal and Thrust Means," now Patent No. 3,050,346.

To provide a satisfactory seal, the frusto-conical washers or Belleville springs which are shown at 17 and shown in their normal state in FIGS. 4 and 6 must be assembled in the positions illustrated wherein the smaller inner annular edges of the washers are in contact and the outer annular edges are separated so that the washers will be compressed and held under compression in assembly. To otherwise position the two washers would reduce the effectiveness of the seal. It is also desirable that the washers be protected against rust and foreign matter before they are assembled and it is desirable that some method be provided for retaining the seal assembly in the annular recess 16 while the pin 13 and bushing 12 are being inserted into their respective positions. This is accomplished by packaging the washers as best shown in FIGS. 2 and 3.

In FIG. 2 the two washers 17 are shown as placed in their properly assembled position relative to each other over a mandrel 18 which is of substantially the same diameter as the track pins 13 and they are supported above a work surface 19 by several small spacers such as indicated at 20. A sheet of plastic material 21 which is impervious to air and pliable when heated is placed over the washers so assembled on the mandrel from the position shown at 22 in broken lines and is drawn by suction into the configuration shown in FIG. 2. Suction is applied by any suitable means through a central bore extending through the mandrel 18 and table as shown at 23 and a plurality of bores 24 in the work surface itself. Alternatively a screen or other pervious material may be substituted for the work surface 19. The plastic material which may be a vinyl substance is caused to conform to the mandrel 18 and also to be drawn between the outer spaced edges of the seal elements as indicated at 25 and beneath the lower element as indicated at 26. The marginal edges of the sheet 21 are then trimmed as by a die to substantially the same diameter as the package itself so that the completed package presents the appearance illustarted in FIG. 3.

The entire package is inserted into the seal recess 16 as shown in FIG. 4 with the cylindrical projection 28 thereof which is formed by the mandrel 18 contained within the pin bore of the boss 14. Since the mandrel 18 is of substantially the same size as the pin, the external surface of the cylindrical portion 28 is somewhat larger than the pin bore and an interference fit is produced providing sufficient frictional engagement between the cylindrical portion and the pin bore to firmly retain the package in the position shown in FIG. 4 even though severe vibration is encountered before the pin and bushing 12 are brought

into place to compress the seal members and permanently retain them in the recess **16**. The completed assembly has the appearance illustrated in FIG. 5 where the pin **13** has been pressed into the pin bore of the boss **14** and has acted as a punch to severe the cylindrical portion **28** and extrude it from the pin bore.

In FIG. 5 the portion **28** is shown with its upper part in broken lines as this part is eliminated during its extrusion apparently by the heat of friction occurring when the pin is pressed into its bore.

A modified and simpler form of the invention is shown in FIG. 6 where a preformed cup of plastic paper or any paper-like material is shown at **30** as pressed through the centers of two annular seal elements in their porperly arranged position and then pressed into the pin bore to retain them in this position. The cup has a rim **31** to hold the seal elements together and in axial alignment with each other. This form of the invention does not have the advantage of protecting the sealing surfaces of the seal elements as does the form described above but will be useful in certain types of automatic assembling machinery in which the seal elements are cleansed and not subjected to dirt or abrasive material before they are assembled. The cup of FIG. 6 will, of course, be severed and extruded in much the same manner as that illustrated in FIG. 5 and in both cases, the residual parts of the package or retaining means which remain in the seal recess are rapidly disintegrated by the heat and friction resulting upon operation of the track.

We claim:

1. A package comprising two concentrically disposed frusto-conical seal elements, a sheet of paper-like material embracing the marginal edges of the elements and one side of one element and having a coaxial cylindrical projection on said side to project into and frictionally engage a bore in a part in which the elements are to be used.

2. A package comprising two aligned annular seal elements and including means to hold said elements in an annular recess at one end of a bore, said means including a cylindrical element of paper-like material extending away from the seals, the outer surface of said cylindrical element, along at least its major length, having a diameter less than the diameter of the central aperture in said seals, said cylindrical member being of a size to provide an interference fit with the bore, and means integral with the cylindrical element to secure said cylindrical element to the seal elements in axial alignment with them and to hold the seal elements in axial alignment with each other.

3. The combination of claim **2** in which the axially aligning means comprises a portion of the paper-like cylindrical element which embraces one side and the outer marginal edges of the seal elements.

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