Nov. 12, 1963 R. W. YOCUM 3,110,097

PACKAGING AND ASSEMBLING METHOD FOR SEALS

Filed March 27, 1961

Fig. 1.

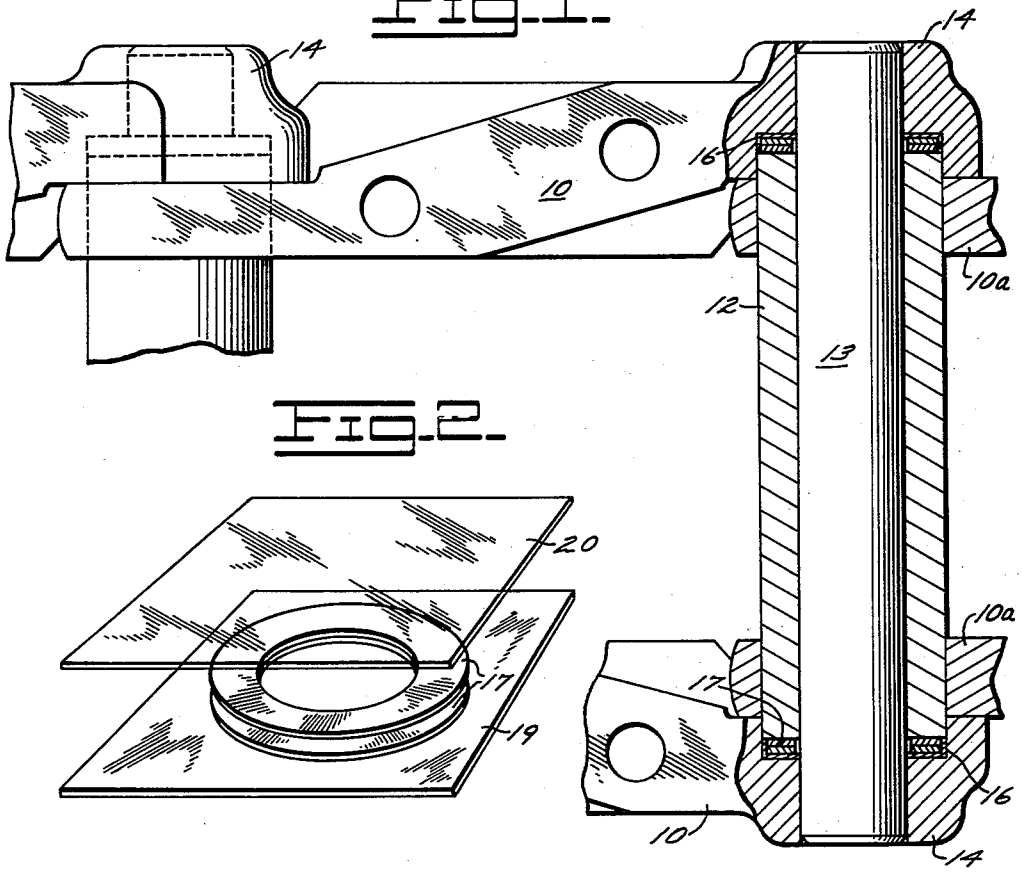


Fig. 2.

Fig. 4.

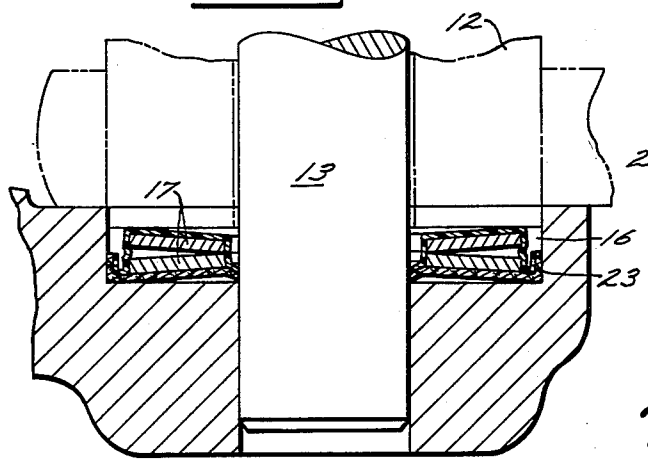
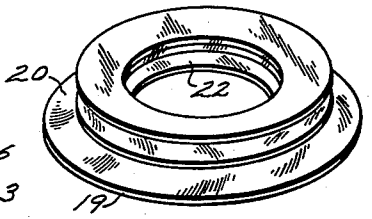


Fig. 3.



INVENTOR.
RALPH W. YOCUM

BY
Fryer and Tjensvold
ATTORNEYS

United States Patent Office 3,110,097 Patented Nov. 12, 1963

3,110,097
PACKAGING AND ASSEMBLING METHOD FOR SEALS

Ralph W. Yocum, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill., a corporation of California

Filed Mar. 27, 1961, Ser. No. 98,653
5 Claims. (Cl. 29—421)

This invention relates to the packaging of seal elements to protect them, to hold them in proper assembled positions and including means to facilitate their assembly between parts where sealing is required.

The invention is directed particularly to the kind of seal disclosed in the 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. The seal of said application comprises a pair of annular resilient frusto-conical washers or Belleville springs compressed in an annular space between parts where sealing is required. It is necessary that the washers be assembled in a prescribed position relative to each other and that they be kept clean and rust free prior to assembly. It is also desirable that some means be provided for holding them in place in an annular recess in one element before second and third elements are brought into place to compress them and retain them in the recess.

It is an object of the present invention to provide a method of packaging and assembling a pair of such annular seal members which assures the accomplishment of the aforesaid necessary and desirable results.

Further and more specific objects and advantages of the invention are made apparent in the following specification wherein the invention is described in detail by reference to the accompanying drawing.

In the drawing:

FIG. 1 is a fragmentary plan view with parts in section of a part of the track assembly of a track-type tractor which includes the packaged seal of the present invention;

FIG. 2 is a perspective view of a pair of seal washers of the kind to which the present invention pertains shown in readiness to be packaged between two paper-like elements;

FIG. 3 is a perspective view of a completed package made of the members illustrated in FIG. 2; and

FIG. 4 is an enlarged sectional view illustrating the manner of assembly of this package into its functional position.

The invention is illustrated in connection with the endless track mechanism for a track-type tractor as a typical environment for its use and in FIG. 1 a pair of track links is illustrated at 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 10*a*. 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 pressed into the bores. 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 the reception of a combined seal and thrust means in the form of a pair of frusto-conical spring washers 17 which serve in a manner fully set forth in the above mentioned co-pending application to provide a seal between the relatively rotating parts.

To provide a satisfactory seal, the frusto-conical washers or Belleville springs 17 must be assembled in the positions illustrated in FIG. 2 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 in a so-called "blister" package and shaping the package in the manner presently to be described.

A "blister" package comprises a sheet of base material 19 (FIG. 2) which is pervious to air and a sheet of plastic material 20 which is impervious to air, pliable when heated and capable of being adhered to the sheet 19. The parts to be packaged such as the washers shown at 17 in FIG. 2 are placed upon the base sheet, the undersurface of which is subjected to a vacuum while the sheet 20 is heated and drawn downwardly to envelop the members to be packaged and to become adhered to the base sheet, all in a well known manner.

For the purpose of the present invention and by way of illustration, the base sheet 20 may be formed of kraft paper of about 90 weight which is approximately .004 inch thick and the cover sheet 20 may be of thermoplastic film of about .003 inch thickness, being a combination of .001 inch of acetate and .002 inch of polyethylene which is adhesively attached to the backing paper when it is drawn over the object to be packaged by suction applied through the backing paper. While a single set of seal elements and two small pieces of packaging material are illustrated in FIG. 2, it is to be understood that many packages may be simultaneously formed with large sheets or long strips of packaging material and may then be separated as by die cutting or the like. In any event, after packaging, the individual packages are trimmed to the configuration shown in FIG. 3 so that an annular margin of the packaging material extends beyond the outer edge of the packaged seal elements to a diameter somewhat larger than the inside diameter of the recess 16 into which the seal is to be assembled. A small flange or margin 22 also projects inwardly from the seal parts to insure that the package will remain sealed.

The first step in assembly is illustrated in FIG. 4 wherein the complete package has been inserted in the annular recess 16 with the outer marginal flange of the packaging elements being folded or compressed into close engagement with the walls of the recess as indicated at 23. This insures that the seal elements are frictionally retained in the recess while the pin 13 is inserted and while the bushing 12 shown in broken lines in FIG. 4 is brought into place prior to the application of pressure which distorts the seal elements into their flat face to face position illustrated in FIG. 1. The paperlike packaging elements are of such thin material that their presence may be disregarded and they are quickly worn away or disintegrated during operation of the seal.

The foregoing described packaging means not only protects the seal elements from rust and dirt but affords a method to insure their being assembled in their proper relative positions so that they will not be improperly assembled through carelessness or ignorance.

I claim:

1. The method of protecting and assembling of an annular group of seal elements to be employed in an annular recess which comprises forming a blister pack-

age of said elements, trimming the package to provide a marginal edge exceeding in diameter the inside diameter of the recess, and forcing the packaged elements into the recess to distort the marginal edge of the package into frictional engagement with the walls of the recess.

2. The method of protecting and assembling of an annular group of seal elements to be employed in an annular recess which comprises forming a blister package of said elements in their functional relationship to each other and with a marginal edge of packaging material of greater dimension than the inside diameter of the recess, and then forcing the packaged assembly into the recess.

3. The method of protecting and assembling seal parts into a recess for temporary retention therein prior to the application of permanent retaining means which comprises first forming a blister package of the parts in functionally related positions, then trimming the package to provide a marginal edge conforming in shape to but slightly larger than the recess, and then pressing the package into the recess with sufficient force to distort the marginal edge into frictional contact with the inner wall of the recess.

4. The method of protecting, forming and assembling an annular group of seal elements into an annular recess which comprises placing the elements on a sheet of porous material, covering them with a protective sheet, applying suction through the porous sheet to draw the protective sheet over the group, then trimming the sheets to provide a marginal edge slightly greater in diameter than the recess, and then forcing the assembly so packaged into the recess to provide frictional engagement between said marginal edge and the walls of the recess.

5. The method of claim 4 in which the marginal edges of the porous and protective sheets are sealed together.

References Cited in the file of this patent

UNITED STATES PATENTS

2,093,092	McElhany et al.	Sept. 14, 1937
2,101,996	Gerstenberg	Dec. 14, 1937
2,122,477	Leonard	July 5, 1938
2,690,593	Abercrombie	Oct. 5, 1954
2,945,586	Mackes	July 19, 1960
2,950,004	Acomb	Aug. 23, 1960
2,985,296	Kahn	May 23, 1961
3,024,525	Wisberger	Mar. 13, 1962