

March 7, 1967

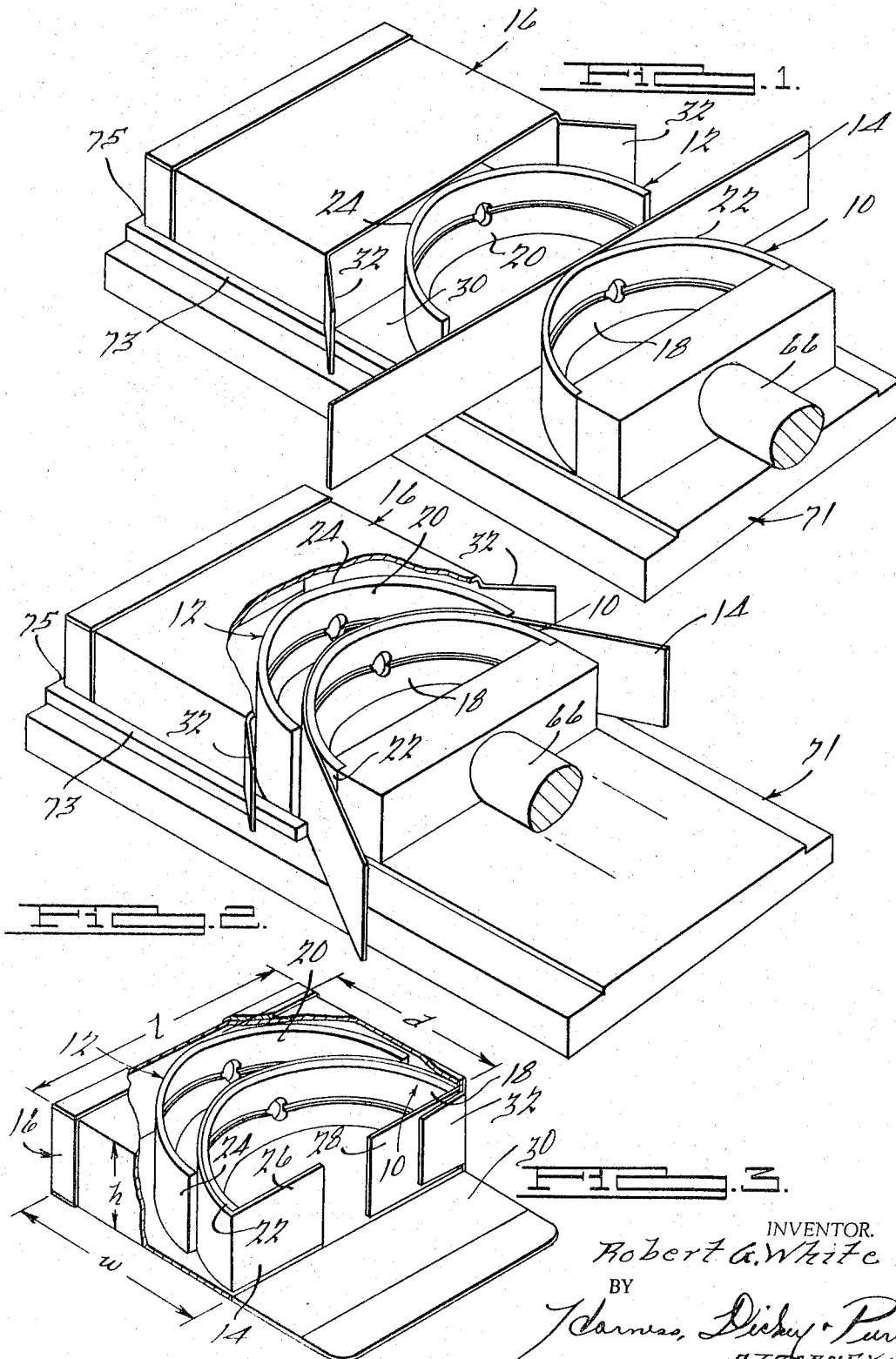
R. G. WHITE

3,307,685

BEARING PACKAGE WITH INSERT

Filed June 3, 1964

2 Sheets-Sheet 1



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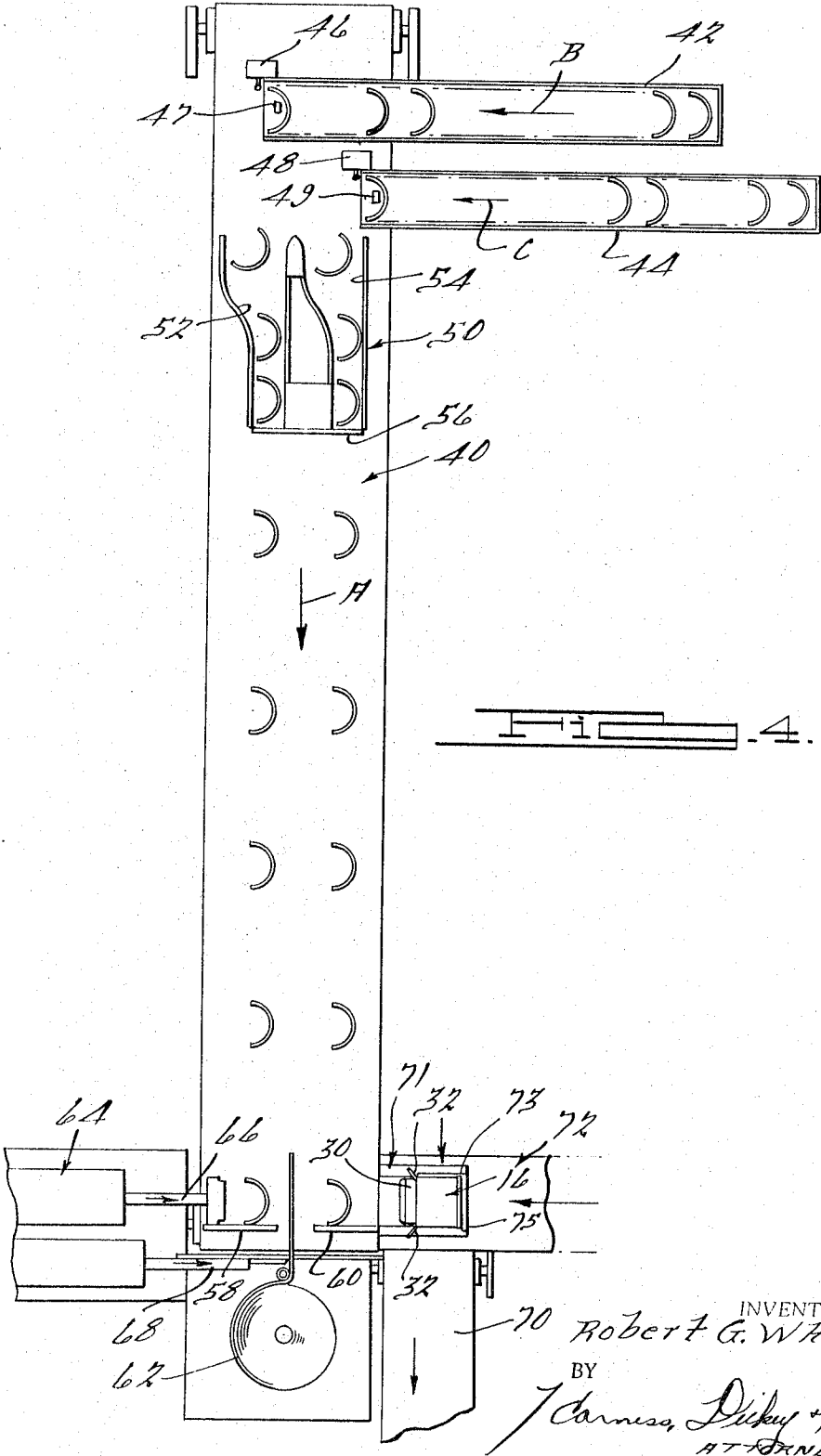
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BEARING PACKAGE WITH INSERT

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7 Claims. (Cl. 206-46)

This invention relates to package constructions and to systems and methods of packaging articles and more particularly to package constructions and systems and methods of packaging shell type bearing halves.

In the packaging of engine sleeve bearings in the past, a mating pair of semicylindrical bearing halves have been packed in a carton with their openings facing each other and with a stiff cardboard or other type of insert extending therebetween in order to separate the bearing halves and to protect the delicate lining surface of the bearing halves from being scratched or otherwise damaged by the end of its mating bearing half. It is well known that scratching, nicking, etc., of this delicate surface is ruinous to the interior surface of such bearings being known as the lining. With such packaging techniques, a carton or box has been required which is at least as large as the diameter of the bearing halves.

In the present invention a novel package assembly is provided whereby the bearing halves can be nested one within the other while still protecting the lining surface from damage and hence permitting the use of a substantially smaller carton resulting in a savings in the cost of the carton and also a savings in the cost of stocking these bearings since more bearings can be stored in a given space. The present invention also provides a novel system and method of packaging shell bearing halves.

Therefore, it is a general object of this invention to provide a novel package assembly for shell bearings whereby the shell bearing halves can be assembled in a nested condition and shipped and stored with the probability of damage to their linings being minimized.

It is an object of this invention to provide a novel system for packaging shell type bearing halves.

It is another object of this invention to provide a novel method of packaging shell type bearing halves.

Other objects, features and advantages of the present invention will become apparent from the subsequent description and the appended claims, taken in conjunction with the accompanying drawings, in which:

FIGURE 1 is a pictorial view depicting the relationship between a carton for receiving a pair of sleeve type shell bearing halves, a pair of bearing halves and a separating member prior to insertion of the bearing halves within the carton;

FIGURE 2 is a pictorial view similar to that of FIGURE 1 with the carton partially broken away showing the relationship of the above mentioned parts during an intermediate stage in the insertion of the bearing halves and separating member into the carton;

FIGURE 3 is a view similar to that of FIGURES 1 and 2, to reduced scale, with the carton partially broken away depicting the relationship of the bearing halves and the separating member after assembly within the carton; and

FIGURE 4 is a top elevational view of an automated assembly line for assembling the bearing halves within a carton.

Looking now to FIGURES 1-3, a matable pair of shell bearing halves 10 and 12 are shown to be assembled within a carton 16 and are separated by a thin separating member 14. The bearing halves 10 and 12 are generally semicylindrical and have relatively soft lining surfaces 18 and 20, respectively, at their radially inner surfaces. The radially outer surfaces 22 and 24 of the bearing halves 10 and 12, respectively, are harder and each terminates in ends which, if brought into engagement with

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the delicate lining surface of the other, could scratch, nick or otherwise ruin that lining surface. In packaging bearing halves, such as bearing halves 10 and 12, it is desirable to use the smallest size carton possible while still preventing the ends of each of the bearing halves from engaging the lining surface of the other.

Looking now to FIGURE 3, the bearing halves 10 and 12 are located within the carton 16 with the forward one 10 being nested within the rearward one 12 and with the radially outer surface 22 of the forward one 10 being located proximate to and in confrontation with the radially inner surface 20 of the rearward one 12. The bearing halves 10 and 12 are separated at their confronting surfaces by the thin separating member 14 which can be made of cardboard, plastic or some other suitable material. In the preferred embodiment the separating member 14 is flexible and easily bent whereby it can assume an arcuate contour approximating that of the bearing halves 10, 12, and is of a width substantially equal to the width of the bearing halves 10, 12. The separating member 14 has a length at least sufficient to separate the bearing halves 10, 12 from each other regardless of relative movement of the bearing halves 10, 12 and separating member 14 to extreme positions within the carton 16. In the preferred embodiment the separating member 14 is of a length greater than the circumferential length of the bearing halves 10, 12 whereby the excess length can be bent or folded at each end to define tabs 26, 28 which act to positively lock the separating member 14 to the forward bearing half 10 whereby engagement between bearing halves 10 and 12 is made literally impossible.

The carton 16 is of a minimum size and has a height h substantially equal to the width of the bearing halves 10, 12 and a length l substantially equal to the diameter defined by the bearing halves 10, 12. The carton 16 has a width w substantially equal to the distance d between a first plane extending across the ends of the forward bearing half 10 and a second plane parallel to the first plane and substantially tangent to the radially outer surface 24 of the rearward bearing half 12. The carton 16 has an opening at one end and has a bottom flap 30 and a pair of side flaps 32 for closing the opening in a conventional manner. Thus the package assembly utilizes a carton of minimum size and assures that the lining of each of the bearing halves contained therein cannot be damaged by the other.

While the bearing halves can be packed into cartons by hand, a system for packing shell bearing halves such as 10 and 12 into a carton such as 16 is shown in FIGURE 4. A conveyor line 40 has a belt which moves in the direction of the arrow A for carrying bearing halves from its receiving end to its discharge end. Each of a pair of sloping chutes 42 and 44 carries a supply of shell bearing halves and has its discharge end proximate to the line 40 for discharging the bearing halves onto the belt at the receiving end of the line 40. The bearing halves move down the chutes 42 and 44 in the direction of the arrows B and C, respectively, with the chutes 42, 44 being staggered relative to each other such that the bearing halves discharged from one chute are offset relative to those discharged from the other chute. Solenoid actuated gates 47 and 49, which operate in a manner to be described, are connected with the chutes 42 and 44, respectively, for controlling the feeding of the bearing halves onto the conveyor 40.

An aligning mechanism 50 is located along the conveyor line 40 and has a pair of channels 52 and 54 which are located to be in the path of travel of the bearing halves from chutes 42 and 44, respectively. The channels 52, 54 are outwardly flared at their receiving ends and gradually narrow to a dimension substantially equal to the radius of the bearing halves. The bearing halves

are discharged out of the chutes 42, 44 with their radially inner surfaces facing substantially in the same direction. These bearing halves as discharged may be slightly turned from the proper direction, however, the channels 52, 54, as shown in FIGURE 4, automatically turn the bearing halves in the desired direction. For reasons to be presently understood, it is important that the bearing halves be conveyed in pairs with one aligned behind the other. To do this a solenoid operated gate 56 is provided at the exit of the channels 52, 54 which will open only when a pair of bearing halves are located one behind the other within the channels 52, 54 and proximate to the gate 56. A sensing device, not shown, such as a light cell or switching device determines when a pair of bearing halves are properly located at the exit. Responsively to this signal, the gate 56 is actuated. The actuation of the gate 56 triggers the solenoid operated gates 47 and 49 for feed chutes 42 and 44, respectively, with a time delay provided for the actuation of gate 49 in order to compensate for the spacing between chutes 42 and 44 in a direction along the conveyor 40; the gates 47 and 49 are closed responsively to actuation of switches 46 and 48, respectively, by the bearing half being discharged.

Thus the pair of bearing halves leaving the aligning mechanism 50 are located one in back of the other with both opening in the same direction along a common axis. The pair of bearing halves are moved to the discharge end of conveyor 40 against locating stops 58 and 60. At this time a strip of cardboard from a reel 62 is located between the bearing halves. The location of the bearing halves against the stops 58 and 60 is sensed, by means well known in the art, and a signal provided whereby a ram mechanism 64 is actuated. The ram mechanism includes a ram 66 having a head which is matable within the opening of the forward bearing half and upon actuation of the mechanism 64 is moved into engagement therewith and towards the strip of cardboard from the reel 62. As the ram 66 moves the forward bearing half, a cutter assembly 68 is actuated to cut the strip from the reel 62. Hence the ram 66 then moves the forward bearing half into the severed strip and then into nested engagement with the rearward bearing half (see FIGURES 1 and 2) and all are moved through an opening into a carton 16 (see FIGURE 3). The carton 16 is located upon a receiving platform 71 which has edges 73 and 75 for locating and restraining the carton 16 during the assembly step. The severed strip, of course, is the separating member 14 and is then bent into the curvature of the bearing halves. The carton 16 with the bearing halves thus assembled is then moved onto a conveyor 70 by means not shown, where the package is carried to the next stage where the carton 16 is closed with the ends of the separating member being bent to form a positive lock with the forward bearing half. As the carton 16 is moved onto conveyor 70 a new carton is moved into its place by means of a carton feed mechanism 72 which is actuated, by means well known in the art, to move a new carton into the proper position at the discharge end of conveyor assembly 40. Note that in the discussion of the system of FIGURE 4, only those portions necessary to properly describe the invention have been set forth and for the sake of simplicity a detailed discussion of portions well known in the art or within the purview of an experienced mechanic or technician have been omitted.

While it will be apparent that the preferred embodiment of the invention disclosed is well calculated to fulfill the objects above stated, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claims.

What is claimed is:

1. A package assembly for a pair of semicylindrical shell bearing halves comprising: an enclosable carton, the bearing halves being snugly located within the carton with one of the bearing halves being nested within the other with the radially outer surface of the forward one

of the bearing halves being located proximate to and in confrontation with the radially inner surface of the rearward one of the bearing halves, thin separating means wrapped partially around one bearing half only, said separating means being in strip form located between the bearing halves for permitting nesting of the bearing halves one within the other while maintaining the bearing halves separate from each other regardless of relative movement of the bearing halves within the confines of said carton, whereby the other bearing half need be protected only by said separating means and the carton wall, said separating means including means for locking said separating means to one of the bearing halves whereby relative movement between said separating means and that one of the bearing halves is substantially minimized.

2. A package assembly for a pair of semicylindrical shell bearing halves comprising: an enclosable carton, the bearing halves being located within the carton with one of the bearing halves being nested within the other with the radially outer surface of the forward one of the bearing halves being located proximate to and in confrontation with the radially inner surface of the rearward one of the bearing halves, thin, flexible, elongated separating means wrapped partially around one bearing half only, said separating means being in strip form and being of a one piece construction separate from said carton and located between the bearing halves and being made of a readily deformable material whereby said separating member can assume an arcuate contour approximating the arcuate contour of bearing halves and being of a length sufficient to maintain the bearing halves separate from each other regardless of relative movement of the bearing halves within the confines of said carton, whereby the other bearing half need be protected only by said separating means and the carton wall, said carton having a height substantially equal to the width of the bearing halves and a length substantially equal to the diametrical dimension of the bearing halves, and with the bearing halves in their nested condition with said separating means located therebetween, said carton having a width substantially equal to the distance between a first plane extending across the ends of the forward one of the bearing halves and a second plane parallel to said first plane and being substantially tangent to the radially outer surface of the rearward one of the bearing halves.

3. A package assembly for a pair of semicylindrical shell bearing halves comprising: an enclosable carton, the bearing halves being located within the carton with one of the bearing halves being nested within the other with the radially outer surface of the forward one of the bearing halves being located proximate to and in confrontation with the radially inner surface of the rearward one of the bearing halves, thin, flexible, elongated separating means wrapped partially around one bearing half only, said separating means being in strip form and located between the bearing halves and being made of a readily deformable material whereby said separating member can assume an arcuate contour approximating the arcuate contour of the bearing halves and being of a length sufficient to maintain the bearing halves separate from each other regardless of relative movement of the bearing halves within the confines of said carton, whereby the other bearing half need be protected only by said separating means and the carton wall, said separating means being separate from said carton and being of a one piece construction and of a length substantially in excess of the circumferential length of each of the bearing halves with the excess length defining means for locking said separating means to one of the bearing halves, said carton having a height substantially equal to the width of the bearing halves and a length substantially equal to the diametrical dimension of the bearing halves, and with the bearing halves in their nested condition with said separating means located therebetween, said carton having a width substantially equal to the distance between a first

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plane extending across the ends of the forward one of the bearing halves and a second plane parallel to said first plane and being substantially tangent to the radially outer surface of the rearward one of the bearing halves.

4. A package assembly for a pair of semicylindrical shell bearing halves comprising: an enclosable carton, the bearing halves being snugly located within the carton with one of the bearing halves being nested within the other with the radially outer surface of the forward one of the bearing halves being located proximate to and in confrontation with the radially inner surface of the rearward one of the bearing halves, a thin, flexible one piece separating strip member wrapped partially around the forward bearing half only, said separating strip member being located between the bearing halves and being made of a readily deformable material whereby said separating strip member can assume an arcuate contour approximating the arcuate contour of the bearing halves and being of a length substantially in excess of the circumferential length of each of the bearing halves with the excess length being bent over at each end to grip the forward bearing half, whereby the rearward bearing half need be protected only by said separating strip member and the carton wall, said carton having a height substantially equal to the width of the bearing halves and a length substantially equal to the diametrical dimension of the bearing halves, and with the bearing halves in their nested condition with said separating strip member located therebetween, said carton having a width substantially equal to the distance between a first plane extending across the ends of the forward one of the bearing halves and a second plane parallel to said first plane and being substantially tangent to the radially outer surface of the rearward one of the bearing halves.

5. A package assembly for a pair of semicylindrical shell bearing halves comprising: an enclosable carton, means on said carton for selectively opening and closing said carton whereby the bearing halves can be moved into and out of said carton, the bearing halves being snugly located within the carton with one of the bearing halves being nested within the other with the radially outer surface of the forward one of the bearing halves being located proximate to and in confrontation with the radially inner surface of the rearward one of the bearing halves, a thin, flexible one piece separating strip member wrapped partially around one bearing half only, said separating strip member being located between the bearing halves and being made of a readily deformable material whereby said separating strip member can assume an arcuate contour approximating the arcuate contour of the bearing halves and being of a length sufficient to maintain the bearing halves separate from each other regardless of relative movement of the bearing halves within the confines of said carton whereby the other bearing half need be protected only by said separating strip member and the carton wall, said carton having a height substantially equal to the width of the bearing halves and a length substantially equal to the diametrical dimension of the bearing valves, and with the bearing halves in their nested condition with said separating strip member located therebetween, said carton having a width substantially equal to the distance between a first plane extending across the ends of the forward one of the bearing halves and a second plane parallel to said first plane and being substantially tangent to the radially outer surface of the rearward one of the bearing halves, said means providing an opening in said carton in a plane having the length and height of said carton.

6. A package assembly for a pair of semicylindrical

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shell bearing halves comprising: an enclosable carton, the bearing halves being snugly located within the carton with one of the bearing halves being nested within the other with the radially outer surface of the forward one of the bearing halves being located proximate to and in confrontation with the radially inner surface of the rearward one of the bearing halves, a thin, flexible one piece separating strip member of a readily deformable, cardboard-like material wrapped partially around one bearing half only said separating strip member assuming an arcuate contour approximating the arcuate contour of the bearing halves and being of a length greater than the circumferential length of each of the bearing halves with the excess length being bent over at each end to grip one of the bearing halves and being of a width no greater than the width of the bearing halves whereby the other bearing half need be protected only by said separating strip member and the carton walls, said carton having a height substantially equal to the width of the bearing halves and a length substantially equal to the diametrical dimension of the bearing halves, and with the bearing halves in their nested condition with said separating strip member located therebetween, said carton having a width substantially equal to the distance between a first plane extending across the ends of the forward one of the bearing halves and a second plane parallel to said first plane and being substantially tangent to the radially outer surface of the rearward one of the bearing halves.

7. A package assembly for a pair of semicylindrical shell bearing halves comprising: an enclosable carton, the bearing halves being snugly located within the carton with one of the bearing halves being nested within the other with the radially outer surface of the forward one of the bearing halves being located proximate to and in confrontation with the radially inner surface of the rearward one of the bearing halves, a thin, flexible one piece separating strip member wrapped partially around the forward bearing half only, said separating strip member being located between the bearing halves and being made of a readily deformable, cardboard-like material whereby said separating strip member can assume an arcuate contour approximating the arcuate contour of the bearing halves and being of a length substantially in excess of the circumferential length of each of the bearing halves with the excess length being bent over at each end to grip the forward bearing half and being of a width no greater than the width of the bearing halves, whereby the rearward bearing half need be protected only by said separating member and the carton walls, said carton having a height substantially equal to the width of the bearing halves and a length substantially equal to the diametrical dimension of the bearing halves, and with the bearing halves in their nested condition with said separating strip member located therebetween, said carton having a width substantially equal to the distance between a first plane extending across the ends of the forward one of the bearing halves and a second plane parallel to said first plane and being substantially tangent to the radially outer surface of the rearward one of the bearing halves.

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