A spiral wound retaining ring 10 with angled ends 214 and 216 is disclosed. The ring is crimped 220 at the same angle as the ring ends to maintain a constant thickness dimension. The angling of the ends of the ring and crimp allow the ends to be positioned closer together while maintaining enough clearance to enable insertion and removal of the ring. By reducing the separation distance between the ends a stronger ring results since the double layer area of the ring is maximized.

5 Claims, 5 Drawing Figures
MODIFIED SPIRAL WOUND RETAINING RING

ORIGIN OF THE INVENTION

The invention described herein was made by an employee of the United States Government and may be manufactured and used by or for the Government for governmental purposes without the payment of any royalties thereon or therefor.

TECHNICAL FIELD

This invention relates to retaining rings and in particular to spiral wound retaining rings.

A retaining ring is used in a groove inside a retaining cylinder (interior ring) or outside a retaining cylinder (exterior ring). The ring protrudes from the groove so as to block a slightly smaller retained cylinder shaped within the retaining cylinder (in the case of an interior ring) or slightly larger retained cylinder within which the retaining cylinder is slipped (in the case of an exterior ring). In either case, the ring provides an abuttment for the retained cylinder strong enough to withstand the load applied to the retained cylinder.

BACKGROUND OF THE INVENTION

Spiral wound retaining rings are well known in the art. These rings consist of two or more turns of a flat material wound to provide a continuous coil. The typical ring is wound two times, the end of the material not quite reaching the beginning. Thus, about 80-90 percent of the ring is comprised of a double layer, the remaining 20 percent is a single layer. This single layer area is necessary to facilitate insertion and removal of the ring. To insert an interior ring the ends are pulled together to temporarily decrease the diameter of the ring, this enables the ring to fit into the cylinder. Once the ring is placed into the groove and the ends released the ring springs back to its larger diameter to stay securely in position. The single layer area provides enough clearance to pull the ends closer together without any overlap since a three layer section would not fit into the groove.

Since the standard retaining ring is comprised of a single layer over from 10-20 percent of its surface the load that is applied to the ring and therethrough to the groove in the retaining cylinder is distributed over from 80-90 percent of the surface of the ring and groove. For most applications this poses no difficulty since the ring and groove can be designed to withstand the entire load over less than their entire surface. However, in critical situations it may be impossible to make the groove so strong and consequently, the grooves may deform when a load is applied. For example, in a particular rocket engine a groove constructed of fiberglass could not withstand a load distributed over only 80-90 percent of the groove. However, the groove could and did withstand the same load when a retaining ring with decreased single layer area was used to distribute the load over approximately 98 percent of the ring and groove surfaces.

It is therefore an object of this invention to provide a retaining ring with decreased single layer area.

Another object of the invention is to provide a retaining ring that distributes a load over a larger proportion of its surface than standard retaining rings.

These and other objects of the present invention and the advantages attendant therewith will be readily un-
1. A spiral wound retaining ring comprising:
a spiral wound ring;
said ring having ends thereof angled within a plane
parallel to the upper and lower surfaces of the ring
with respect to a radial line emerging from the
center of said ring; both of said ends being angled
to the same degree and in the same direction; and
said ring having a crimp oriented on the ring between
said angled ends.

2. A retaining ring as in claim 1 wherein said crimp is
angled at the same angle as said ends are angled within

3. A retaining ring as in claim 2 wherein said crimp is
angled within a plane parallel to the upper and lower surfaces of the
ring with respect to a radial line emerging from the
center of said ring.

4. A retaining ring as in claim 3 spirally wound into at
least two layers over most of the area of the ring.

5. A retaining ring as in claim 4 wherein 98 percent of
the area of the ring comprises at least two layers.