

# Combining Competencies for Process Excellence

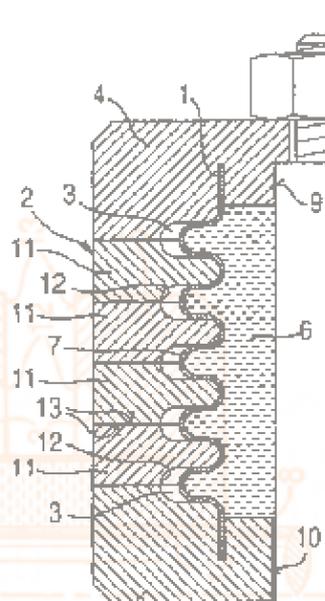
Comprehensive Platinum based solutions for the special glass industries

## Wave-shaped PGM tubes

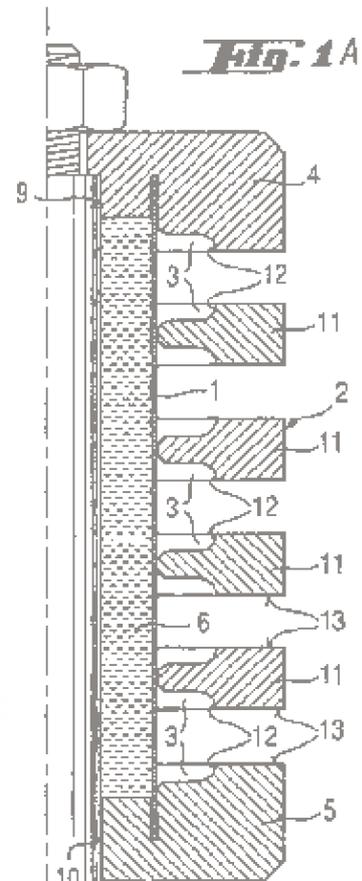
Patented Innovation



**Fig. 1B**



**Fig. 1A**





Umicore's unique process innovation allows to manufacture PGM components with high shape alterations (higher corrugation peaks, sharper folds, and even arbitrary contour shapes) for fusion and hot forming of special glass.

## Complex tasks

Structural parts fabricated from PGM materials are used in the glass industry, in particular in plants for the fusion and hot forming of special glasses.

These are usually PGM sheet-type constructions that are often fabricated as thin-walled tubular systems. As the operating conditions for these components are in the range between 1,000 up to 1,700 °C, one can well imagine that thin-walled sheet metal structures have only a low dimensional rigidity.

In order to compensate for this disadvantage the material thickness must either be increased or the

structure must be stabilized by stiffening forming measures such as the formation of bends, edges, corrugations or folds.

Furthermore, when designing and building such units the high thermal expansion of all materials involved (PGM parts, ceramics, steels, ...) must be considered. The average coefficient of thermal expansion of Pt at 1,500 °C amounts to  $11.2 \times 10^{-6} \text{ K}^{-1}$ .

This means that a Pt structural part of one meter length at room temperature has expanded by 16.6 mm at 1,500 °C!

## Immense advantages

The most crucial advantages of such shaped components in comparison to conventional roll crimping processes are their outstanding stability and their superior resistance towards mechanical, thermal and abrasive stress. Furthermore, they act as strong linear expansion compensators.

Our patent also aims at compensating this effect by the unique capability of the part to be elastic in axial direction while keeping its shape due to the stiffness in radial direction. Hence a high degree of round shape is maintained throughout its lifetime.

A further advantage of this unique manufacturing process is the fact that it avoids reduction of wall thickness in the regions of the corrugations which results in superior stability and hence lifetime of the component.

Last but not least, both seamless or welded smooth-walled PGM tube pieces of circular or polygonal cross-section and of arbitrary radii can be used as initial workpieces.



## Technology Development

We consider innovation to be the most important engine for progress. It will finally translate into Process Excellence for our customers and support them to manufacture products with tailor-made features for their target industries. Umicore is continuously striving for proprietary technologies that enable us to be a leader in our field and support our customers in the best possible way.

For inquiries and additional information please contact

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