

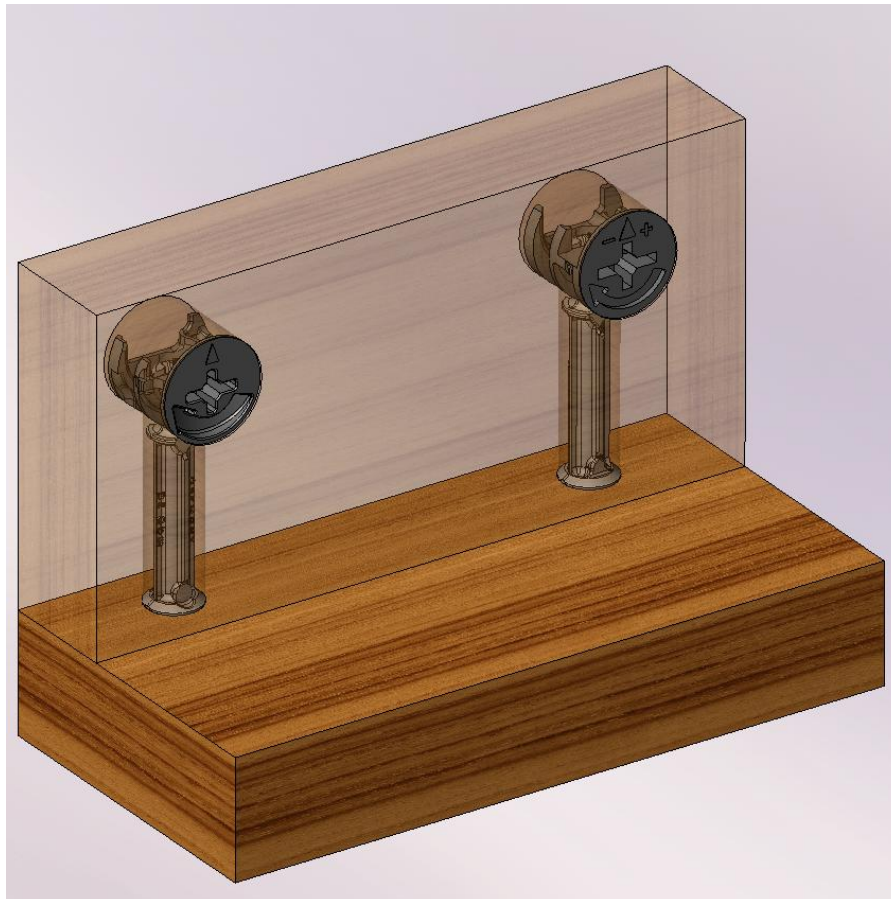


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Product description no. 18620\_1.0  
0904

## Eccentric cam with circumventive cam and decreasing undercut



pic. 01

Standard-application:

Bolt is screwed into existing drill hole, the eccentric cam is pushed into the other drill hole. By turning the eccentric cam a stable connection is created due to an eccentric cam curve which grips underneath the bolt head (pic. 01).

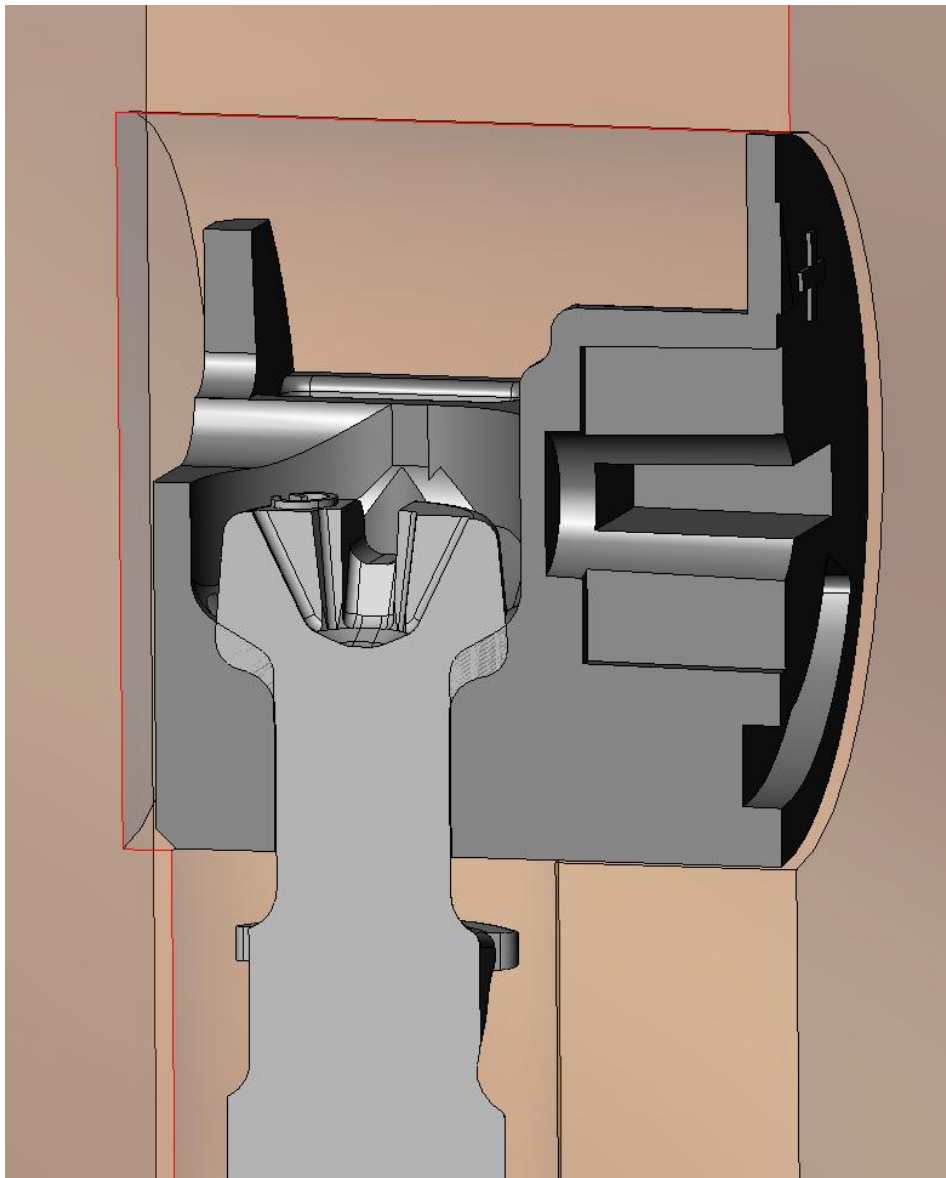
Problems occur if the drill hole distance of the eccentric cam drill hole is not correct or other deviations are present and therefore the pre-defined distance is not adhered to. This increases or decreases the diameter, i.e. the distance of the base board in relation to the eccentric cam curve.

If the distance is too small, then no bolting (tension) of the connection can occur and the connection will no longer work. If the distance is too large, then the stress onto the connection will be too much. This can have the following effects:

- Bolt thread is pulled out of the drill hole
- Bolt head may break off
- Eccentric cam may carve into the wood and will jut out at an angle (visually bad)
- Eccentric cam bends and may break completely.

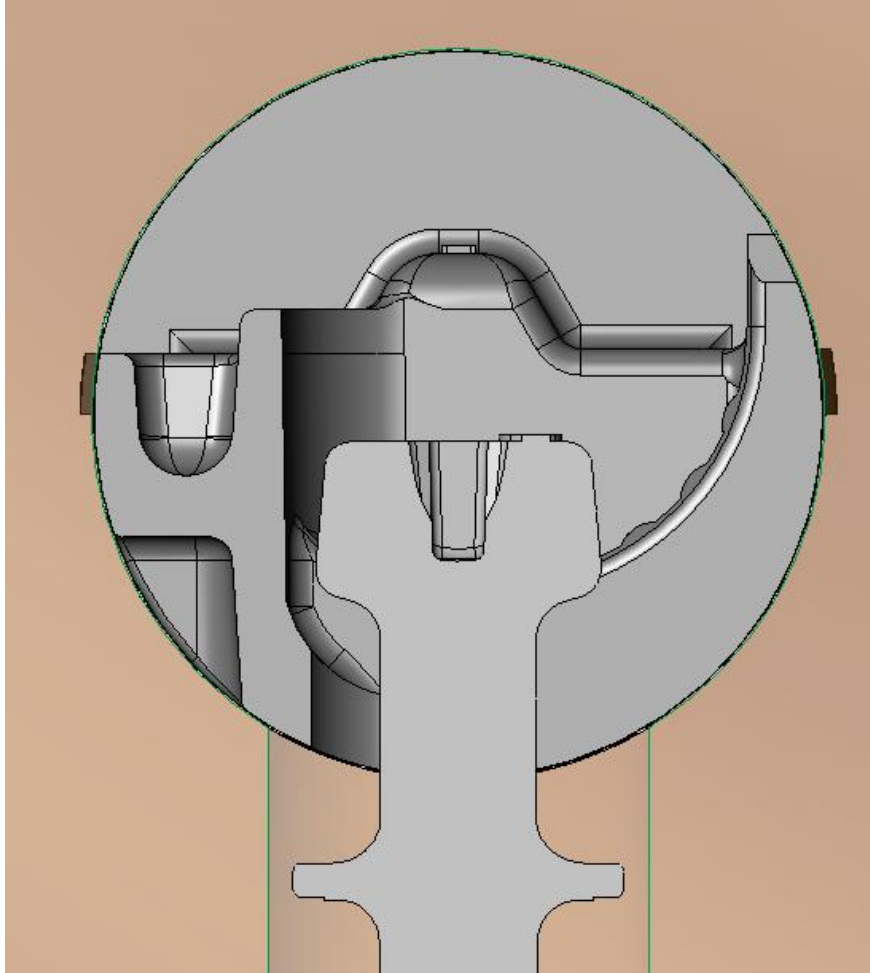
In most cases, the eccentric cam will carve into the wood and bend until it breaks.

The image below (pic. 02), a sectional view of an almost completely tightened eccentric cam, shows how the tensioning works. The intersecting material will be crushed slightly or the intersection reduces if the eccentric cam carves into the material.



pic. 02

In the event of overstress (i.e. if the nominal distance dimension is exceeded by 1mm), then all currently available eccentric cams will no longer perform, since the curve (or the lower leg of the eccentric cam, in pic.02 the left part of the cam) bends away.



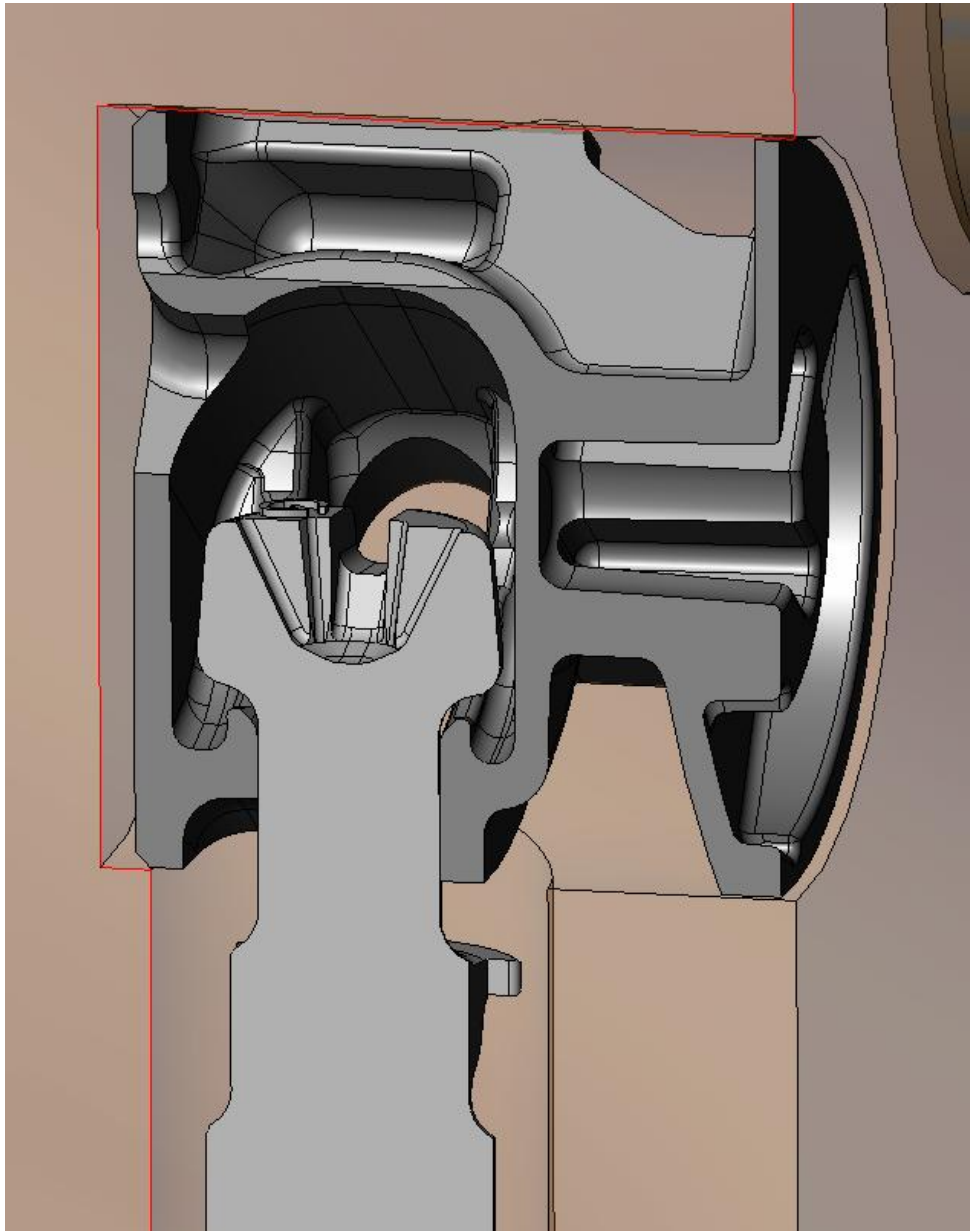
pic. 03

Sectional view of connection in almost completely tightened condition (pic. 03):

- If the diameter is too small then the bolt head will sit too far up, and no tensioning can occur since there is no more contact present.
- If the diameter is too large then the bolt head will sit too far down. The curve hence grips further to the front of the bolt head, and due to the freestanding leg the stress becomes too much since more leverage occurs depending on how soon the head gets into contact with the curve. Eccentric cam will bend until it breaks (leverage of the curve)

The aim is a secure connection which allows a high degree of tolerance.

Since 2007, the curve in the current eccentric cam series 18620 made by G&G Beschläge was modified as follows in order to decrease the stress on eccentric cams (pic. 04):



pic. 04

Behind the actual curve an undercut was created, which allows the eccentric cam to deform (circumventive curve) instead of distorting completely. The material is pushed into the free space of the undercut, which enables the eccentric cam to compensate a diameter tolerance of 1.5 mm in comparison of the 0.8 mm tolerance provided by standard eccentric cams.

Another important point is, however, the safety of the connection against loosening or slacking. This means that once installed the connection may not loosen and even after tightening the eccentric cam several times, no loosening in the connection may occur. Extreme scenarios e.g. furniture moves house several times and the resulting disassembly and re-assembly of the furniture leads to a change in conditions and the diameter may change.

If the eccentric cam with an undercut curve was once overstressed then the complete curve is (deliberately) deformed and can no longer achieve the required tension even if the diameter is correct which means that the connection is loose.

The same may occur for a shear force, i.e. if furniture is moved then the stress onto the connection may increase for the short-term.

#### Conclusion:

Both eccentric cam types (the standard eccentric cams and the new eccentric cams range 18620 made by G&G) have their advantages:

- standard: Secure connection if the diameters are exact and the eccentric cam is overstressed. (pic. 05)
- G&G 18620: Compensates large (manufacturing) tolerances and secure connection, however disadvantages if overstressed. (pic. 06)

#### Aim:

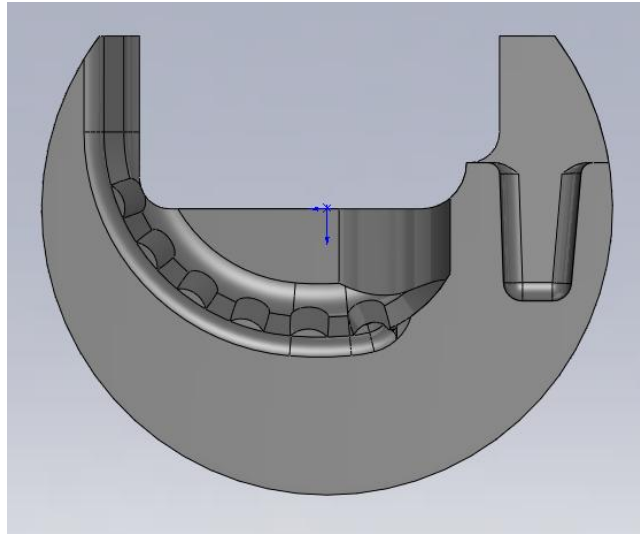
Combine both advantages (pic. 07)

#### Approach:

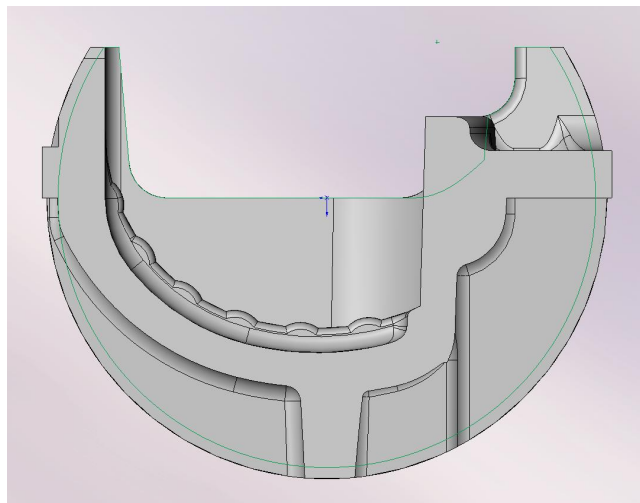
- Deformation of a standard eccentric cam occurs mainly due to the fact that when the eccentric cam is tightened at a diameter that is too large, the stress onto the eccentric cam becomes too much due to the leverage and hence the deformation occurs.
- For the G&G eccentric cam 18620 the connection is loosened after being overstressed by allowing the curve to give way even in the final position (completely closed eccentric cam), i.e. the material is pushed sideways.

The new development is based on the fact that the undercut is large at the start of the curve and decreases towards the end of the curve (decreasing undercut).

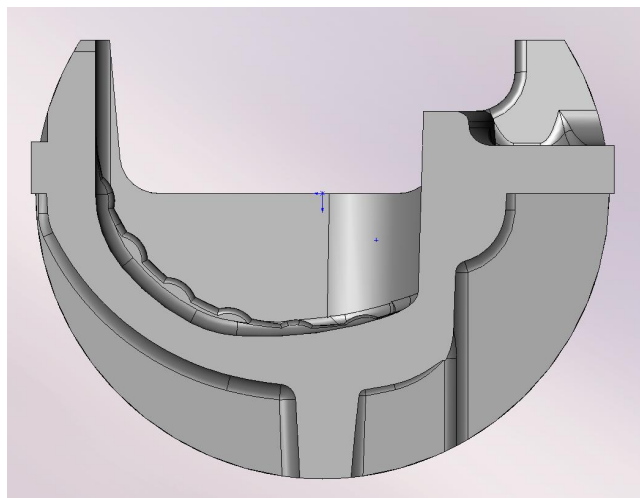
This allows compensate diameter tolerances of 1.5 mm, but it still leads to a connection which is resistant to overstress in the final position, in fact which is even better than in standard eccentric cam since the bending of the eccentric cam is almost completely prevented.



pic. 05



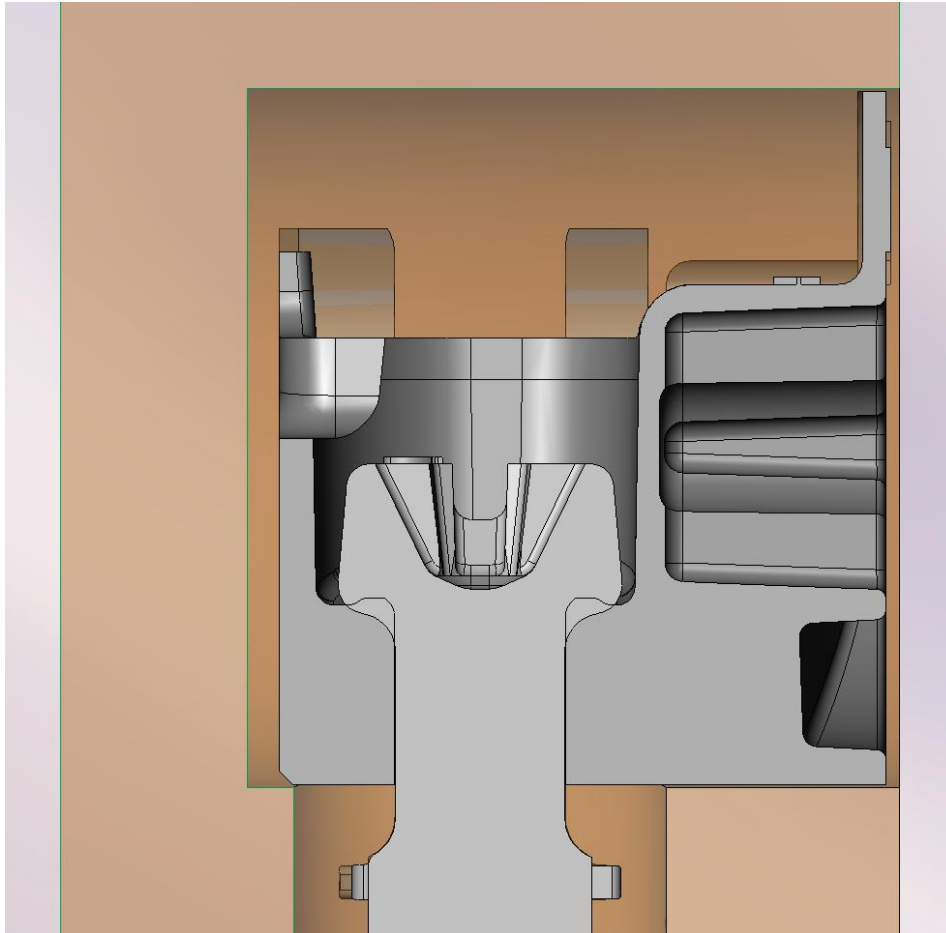
pic. 06



pic. 07



In the newest development, backlash-tolerances of 1.5mm can be compensated, in the end position there is still no overload. This is even better than in current cams, because the bending is prevented due to a better allocation of the forces.



pic. 08

Pic. 08:

Section of the decreasing undercut, almost in final position. In the final position itself there is no longer an undercut present.

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