Industrial hinge with four degrees of freedom*

Abstract

The regulation of a door is a problem likely to appear, either in the household or mainly in the industrial sector. We have all faced the problem of a door that creaks, has not closed properly or needs some adjustment. This may arise either from frequent use of the door (hanging) or due to manufacturing defects, e.g. dimensional deviation from the frame etc.

Today, the traditional process of setting up a door depends on two key factors: a) the door weight, especially if it has to do with special specifications e.g. armored doors and b) the people available to help during setup. With the existence of traditional hinges (one degree of freedom = rotation) the adjustment process starts by:

- unfastening the door
- the adjustment of the hinge by adding (removing) door gaskets
- the potential grinding of the door in the problem areas (wood swelling because of dampness)
- its repositioning

The whole process requires at least two people (shared doors). The setup is usually not successful on first try and the intervention may also be irreversible. As part of the present idea, the construction of a hinge is proposed. The hinge –apart from its standard use- will allow rotation around the z-axis (1st degree of freedom), and the possibility of linear adjustment in both three axes x, y, z (2nd, 3rd and 4th degree of freedom) with the help of three appropriately shaped and installed screws.

The adjustment of the screws is done by one and single person, as there is no requirement to remove the door .Its appropriate operation can be achieved easily, quickly and safely. Of course, there is no need to include material process (e.g. smoothing), thanks to its four degrees of freedom (x,y,z rotation angle), avoiding this way the risk of causing any damage.

The hinge consists of two distinct parts: a) the construction, which can be carried out in a machine shop and b) the trading, which can take place in a company that trades in corresponding products.

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