manus 2007: creative design ideas

Leather splitting machine wins "3rd Plastic Plain Bearing Oscar" – festive presentation of the award in Hanover – entries from all branches of the industry

In a festive ceremony followed by an exhibition stand party at the Hanover Industrial Fair, igus, Cologne, awarded the winner of the 3rd "manus competition for plastic bearing applications". "manus" is the well-known joint initiative with scientific partners that include the Cologne University of Applied Sciences, the Institute for Composite Materials (Kaiserslautern), and other prominent partners. In the United States of America, Brazil, China, Italy, and Great Britain/Ireland, this contest for engineers, designers, and other technical buffs has also been a great success.

About 70 entries were received, which is slightly less than two years ago. This time, however, the five-member jury had "to pass judgement on a real fireworks of excellent entries," says Gerhard Baus, Manager Plastic Bearings at igus. Needless to say, selecting the winner was that much more difficult. Which applications based on the use of lubricant-free and maintenance-free polymer bearings impressed the jury the most in terms of their technical design? Which applications actually proved that they provided the greatest technical improvements or cost savings?

Gold: tanning agents, proteins, fats

Dr.-Ing. Rainer Dorstewitz, Bensheim, won the "manus" in gold award for the design and production of a new type of leather splitting machine called "Autosplit-D3", which is used to process animal skin into usable, high-quality leather. A total of 239 lubricant-free "iglidur" polymer plain bearings and "DryLin" linear plain bearings from igus, including trapezoidal thread nuts, are installed in each "Autosplit-D3". These dry-running, wear-resistant plastic bearings are resistant to the influence of permanent moisture, residue of tanning agents, and attack by animal proteins and fats. Dr. Rainer Dorstewitz: "Under severe ambient conditions, the polymer bearings prove to be very reliable. Several designs," the "manus" winner explains, " would not have turned out to be so compact or inexpensive without the use of these plastic bearings." Leather manufacture is one of the oldest trades in the history of mankind. Dr. Dorstewitz: "This machine does not need any moving parts in the entire bottom bed – the moving parts, which ensure millimetre-precise adaptation to the thickness of the skin, are all accommodated in the top bed." This creates the basis for long-term service life together with high availability. The machine can excellently compensate the non-uniformities of the individual skins – for instance, the skin on the belly sections is thinner and contains more water – in order to provide the leather manufacturer with a grain leather of absolutely uniform thickness.

Silver for fitness room at the touch of a button

Change of application location: the silver "manus" and 2,500 Euro of prize money went to Guenther Beutel, managing partner of KOOPERA GmbH in Oberstenfeld. His "Body Spider", which is already patented in eleven European countries and in the USA, is a multifunctional – unfolding – fitness machine for

Picture PM1407-01: igus GmbH, Cologne
Winner of the golden "manus" 2007: 239 lubricant-free "iglidur" plastic plain bearings and "DryLin" linear bearings are installed in the leather splitting machine "Autosplit-D3" from the engineering office of Dr.-Ing. Rainer Dorstewitz, Bensheim.

training up to 18 persons simultaneously. In Japan, this new fitness machine has become a bit of cult. Requiring very little storage space with a diameter of 80 cm, this machine opens in less than a minute at the touch of a button and turns into a three-dimensional training room. In dynamic groups, several persons can then perform muscle building and coordinating training exercises for all parts of the body. In that fitness machine, "iglidur" plastic plain bearings run in the fold-in and fold-out mechanism. Guenther Beutel: "With more than 220 machines sold so far, there have never been any problems with the bearings. And that's the way it should be: install and forget."

Bronze for optimum bulk material handling

Stefan Groeneweg, Groeneweg Maschinenbau GmbH in Edewecht, received the bronze "manus" and 1,000 Euro for a system that is used for filling and pressing with wiping off equipment for pressing bulk materials together in a single packing process. This device and method are used, for example, in the food industry in order to pack smaller food products in piled form in containers. This type of handling prevents individual product parts from falling out unintentionally. This ensures proper observance of regular weight and volumetric quantity. Here, too, with the mandatory renunciation of the use of lubricants, "iglidur" plastic plain bearings were the first choice and are exposed to, among other things, strong acids and lyes in cleaning processes performed several times a day. Especially in the field of food technology, these plastic plain bearings fulfil the demands for strict maintenance of packing device cleanliness.

Further highlights: non-contact angle sensor, device for out-of-hospital resuscitation

Two other entries met with the jury's special appreciation. One entry is the inexpensive, durable non-contact angle sensor (Helmut Friedl, Megatron AG & Co., Putzbrunn). The absolute value encoder registers angles with 12 bits, which corresponds to a resolution of < 0.1°. Instead of a steel/brass plain bearing, this angle sensor, according to Megatron, has "a high-performance polymer bearing system for the shaft with a diameter of 6 mm." This makes the sensor affordable and suitable "even for medium rotation speeds of up to 3,000 revolutions per minute."

The other highly appreciated entry was the resuscitation device "animax" from Stefan Sessler (AAT Alber Antriebstechnik GmbH, Albstadt). Without requiring the tiring expenditure of force, this device especially supports all helpers, from amateurs to professionals, in providing optimum cardiopulmonary resuscitation by heart pressure massage and artificial respiration. This resuscitation device works without power supply. The portal frame encloses 95 percent of all chest sizes. The device is equipped with "iglidur Z" plastic plain bearings, cylindrical bushes, and flange bushes. These parts are used in the switchover mechanism among other places. The torques produced by the lever are absorbed in the plain bearings.

Many industrial applications, example: filling technology

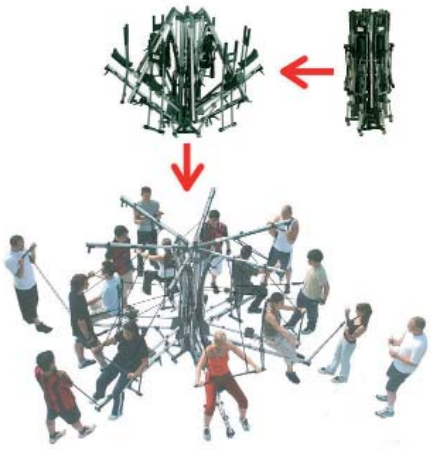
Entries for the 3rd "manus" come from all branches of the industry and include many based on present industrial use. For example the pull-back star from Tino Sickert, Development Engineer at Krones AG in Neutraubling. In modern block systems in the filling technology sector, pull-back stars are interfaces that enable separate operating states during which the individual system component can be operated on an autonomous basis. The pull-back star developed in this case is the interface between a dynamic buffer system and an aseptic filling block. Installed polymer plain bearings from igus that are used as a bearing system for the clamp carrier and the main bearing of the carriage work without lubricants under constantly moist and chemically aggressive ambient conditions.

Another innovative feature is the patented filling valve with integrated pressing-against of the PET bottle by the product pressure (Dieter Krulitsch, Design Engineer at KHS, Bad Kreuznach) in a filling system for CO2-containing beverages. An "iglidur X" special plastic high-temperature plain bearing is mounted on the bellows that produces the pressing-against force. As an axially centring device for the bellows, the polymer bearing runs without wear at an operational temperature of up to 140°C and is resistant to all cleaning agents used in the beverage industry.

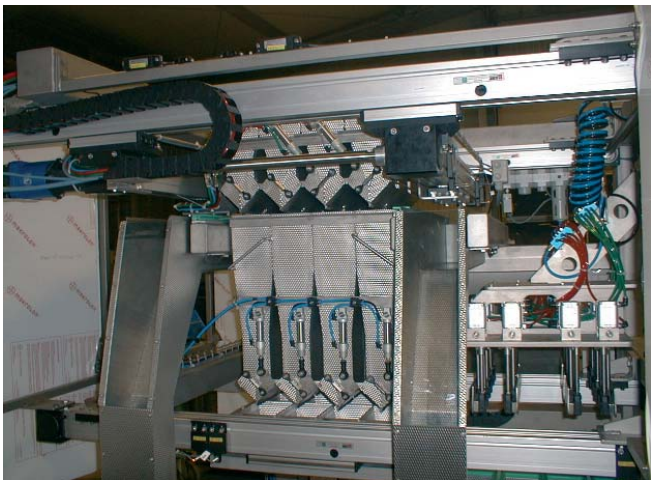
Multifaceted: submarine radio system, climbing robots, automatic mussel opener

Exciting, too, the "communications buoy" for military submarines, a trailing antenna system for radioing in deep submerged positions (Andreas Malletschek, Development Engineer at Howaldtswerke Deutsche

Werft AG, Kiel), also suitable for use in civil oceanography. Here the "iglidur H370" heavy-duty plastic plain bearings prove to be reliable as pressure-proof, corrosion-resistant components when, e.g., exposed to shocks caused by underwater detonations and when used in saltwater environments. Very light "igubal" plastic pedestal bearings are used in this application: the climbing robot "CLAUS" for cleaning windows and façades, which is kept on the window pane on a purely passive basis, i.e. without the use of energy (Professor Dr.-Ing. Werner Brockmann, Technical Informatics, University of Osnabrueck). However, this clinging to the window pane requires that the weight be kept as low as possible in order to prevent the robot from slipping or even falling from the building. Furthermore, the bearings must be lubricant-free; on the one hand, to ensure that the adhesion of the suction cups on the feet is not removed by any lubricant and, on the other hand, to ensure that the window panes to be cleaned do not become dirty. The world's first fully automatic mechanical opening machine for green-lipped mussels was developed by "manus" entrant Peter Neuhaus (Vision Components, Karlsruhe). The great variation in sizes places high demands on the adjustability of the machine when processing this natural product. Installation space-saving "DryLin" linear guides with polymer sliding elements are used for knife guidance, adjustment and transport of the mussel carriage.



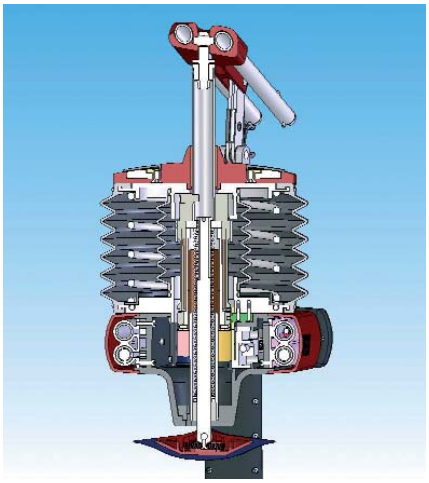
Picture PM1407-02: igus GmbH, Cologne
Silver "manus" 2007: unfolding fitness machine "Body Spider" with maintenance-free "iglidur" plastic plain bearings in the fold-in and fold-out mechanism (Guenther Beutel, KOOPERA GmbH, Oberstenfeld).



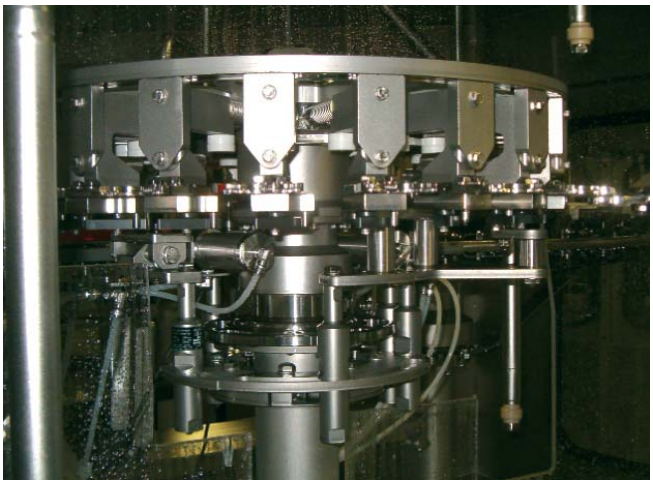
Picture PM1407-03: igus GmbH, Cologne
Pressing bulk materials together in a single packing process: the bronze "manus" goes to Stefan Groeneweg, Groeneweg Maschinenbau GmbH, in Edewecht. Here the polymer bearings are exposed to aggressive acids and lyes.

actual pictures
of the manus ceremony will follow!

Picture PM1407-04: igus GmbH, Cologne
Pictures of the manus ceremony will follow!



Picture PM1407-05: igus GmbH, Cologne
Design of the resuscitation device "animax": maintenance-free "iglidur Z" plastic plain bearings absorb the torques produced by the lever (Stefan Sessler, AAT Alber Antriebstechnik GmbH, Albstadt).



Picture PM1407-06: igus GmbH, Cologne
Numerous entries showed maintenance-free plastic plain bearings in industrial use. For example, this pull-back star, installed in an aseptic filler (Tino Sickert, Krones AG, Neutraubling).

Picture PM1407-07: igus GmbH, Cologne
Plastics for artificial intelligence: climbing robot of Professor Dr.-Ing. Werner Brockmann (Technical Informatics, University of Osnabrueck) for the autonomous cleaning of windows and facades, with light "iglibal" polymer pedestal bearings.

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