



The New Generation of differential



Patented in : Italy - USA – Europe – China – South Korea – India – Japan

**Special Award and Gold Medal
received at the 48th International
Exhibition of Inventions
Geneva 2023**



**PATENTS LOOKING FOR
INVESTOR**

DIPLÔME

Ginventions
Geneva

SALON INTERNATIONAL DES INVENTIONS GENÈVE

Après examen, le Jury International a décidé

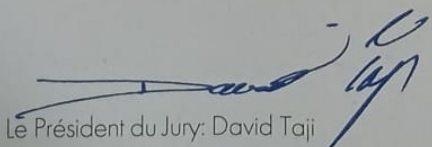
de remettre à: **Crozzoli Gualtiero**

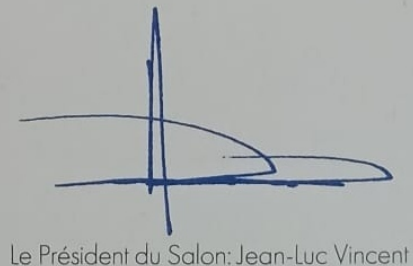
pour l'invention: **Différentiel ou rouleaux de sphères sur des pistes elliptiques convergentes**



MÉDAILLE D'OR
GOLD MEDAL
GOLDMEDAILLE

Genève, le 28 avril 2023


Le Président du Jury: David Tajj

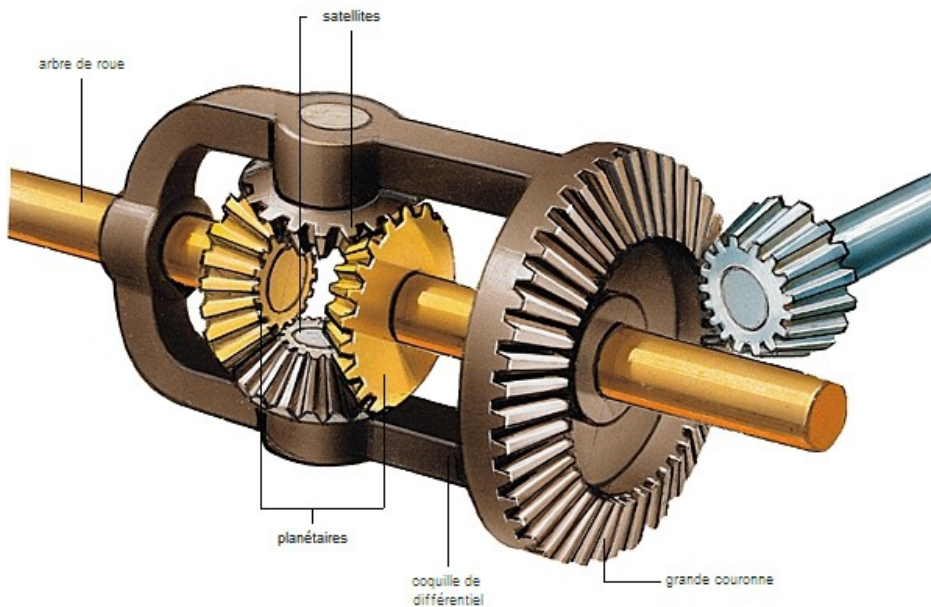

Le Président du Salon: Jean-Luc Vincent

NextGear

The New Generation of differential

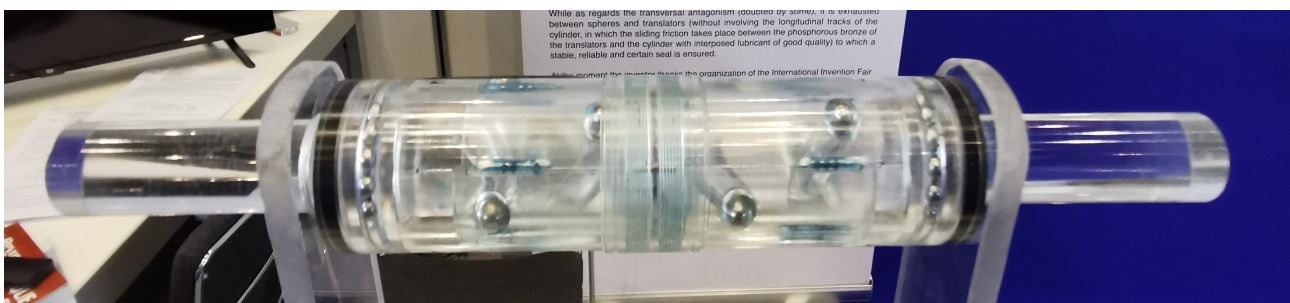
« Sphere or roller differential on converging elliptical tracks »

Actual version of a differential : the diameter is about 180 mm



New generation of the differential with Nextgear :

The diameter is **minimum 50% less**, 90 mm



Patent in Italy - USA – Europe – China – India – South Korea - Japan

The New Generation of differential

Spheres or roller differential on converging elliptical tracks.

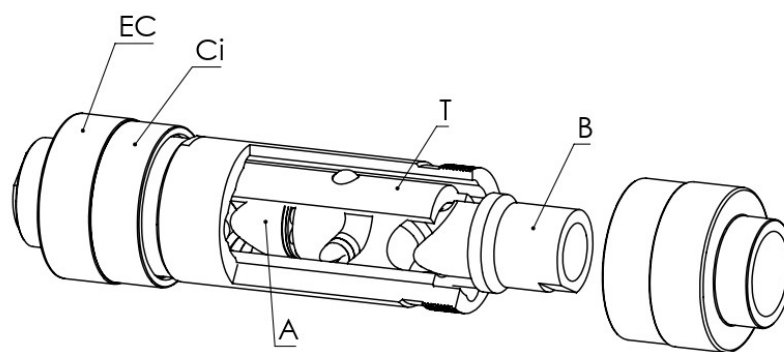
Our differential device matches very well with the E-Axle system, characterizing itself both for functionality and for compactness, this in a concrete and effective way in respect above all, of safety.

The E-Axle as it was conceived is developed on three levels which in the field of electric mobility represents a transition towards the direction of this new electric traction method.

The goal was to ensure that the differential is, in terms of shape and functionality, adaptable to all the needs of the market user, with the prerogative of being equipped with software that is indispensable today, programmed by leading companies in the automotive market, which can be integrated on different platforms.

In the first configuration it consists of a permanent magnet motor and an inverter.

It is possible to wire other components to the system, such as gearboxes and telematic control units.



The use of the project differential (CR) does not require a high know-how, compared to current trends. It is distinguished by:

- Weight reduction,
- Volume reduction at the same power,
- Production with numerical control machines.

E-Axle PowerPrime consists of a motor, inverter and innovative reducer with concentric differential, and can be applied to front and rear wheel drive vehicles, adaptable to powers from 20 to 150 kW (and above).

The average prototype assumes as driveshafts A) and B) a diameter, (sectioned at the minimum variable of 33/35 mm) where two tracks for spheres with a diameter of 12/14 mm are engraved. N4.

The shafts relating to our proposal have tracks, where the spheres slide, the depth of the engraving is about 5 mm, while the translators that guide the spheres can assume thicknesses from 7 mm upwards, based on the diameter of the cylinder they find placed in the center of the rotor, in this case 56/58 mm in diameter D, formed in two pre-assembled sectors, containing the whole set, drive shafts, translators and accessories, having length of the drive shafts 66/68 mm.

The moment of inertia of the towing cross is comparable to a 30 mm diameter shaft D; watch at the drawings.

It seemed obvious to us to configure the proposed system (after an adequate evaluation, which does not seem to present particular higher difficulties as the science of construction allows), so that it could be adapted to various forms, even extreme ones, and equally promising to adequately represent the industry of the future in this sector.

The second configuration is represented by the differential designed to lower the rear axle of vehicles of any type, a lowering equal to 50% of the current system which translates into very high attractive business margins.

The third configuration solves the production synthesis that reflects the pre-existing objective (SOU) of the project.

As far as the contact pressures between spheres and relative guides are concerned, the operation is similar to that of sphere bearings, which in our case roll in the towing phase in the respective tracks for 1/5 of their circumference, this value is decisive in function of the copy to be sent.

In the video of the differential created in an emotional way, we did not take into account the dimensions as we believe that every company has the skills to make this determination.

While as regards the transversal antagonism (doubted by some), it is exhausted between spheres and translators (without involving the longitudinal tracks of the cylinder, in which the sliding friction takes place between the phosphorous bronze of the translators and the cylinder with interposed lubricant of good quality) to which a stable, reliable and certain seal is ensured.

The differential object in all its derivations is currently protected by *Italian, European, USA, Chinese, Japanese, South Korean and Indian patents.*

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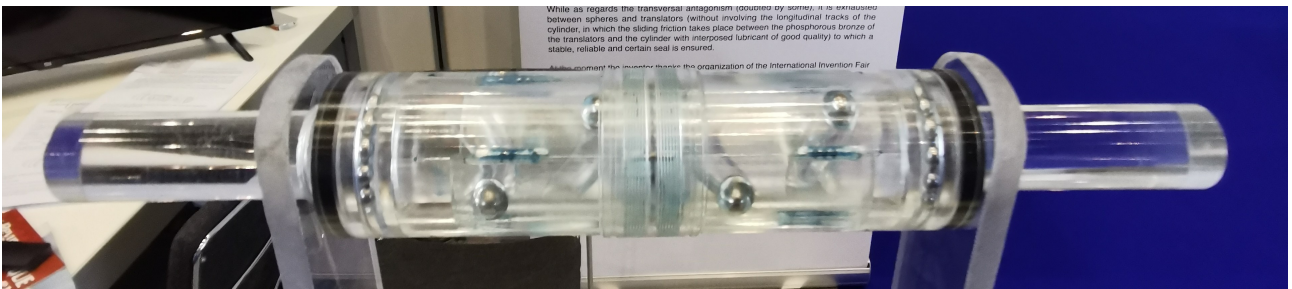
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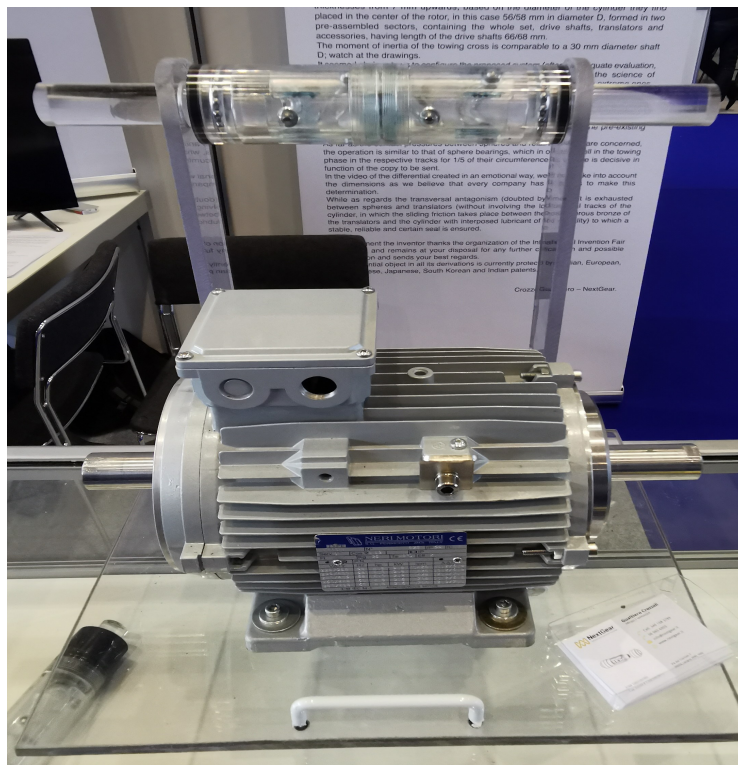
Complementary views and explanations

Transparent view of the differential

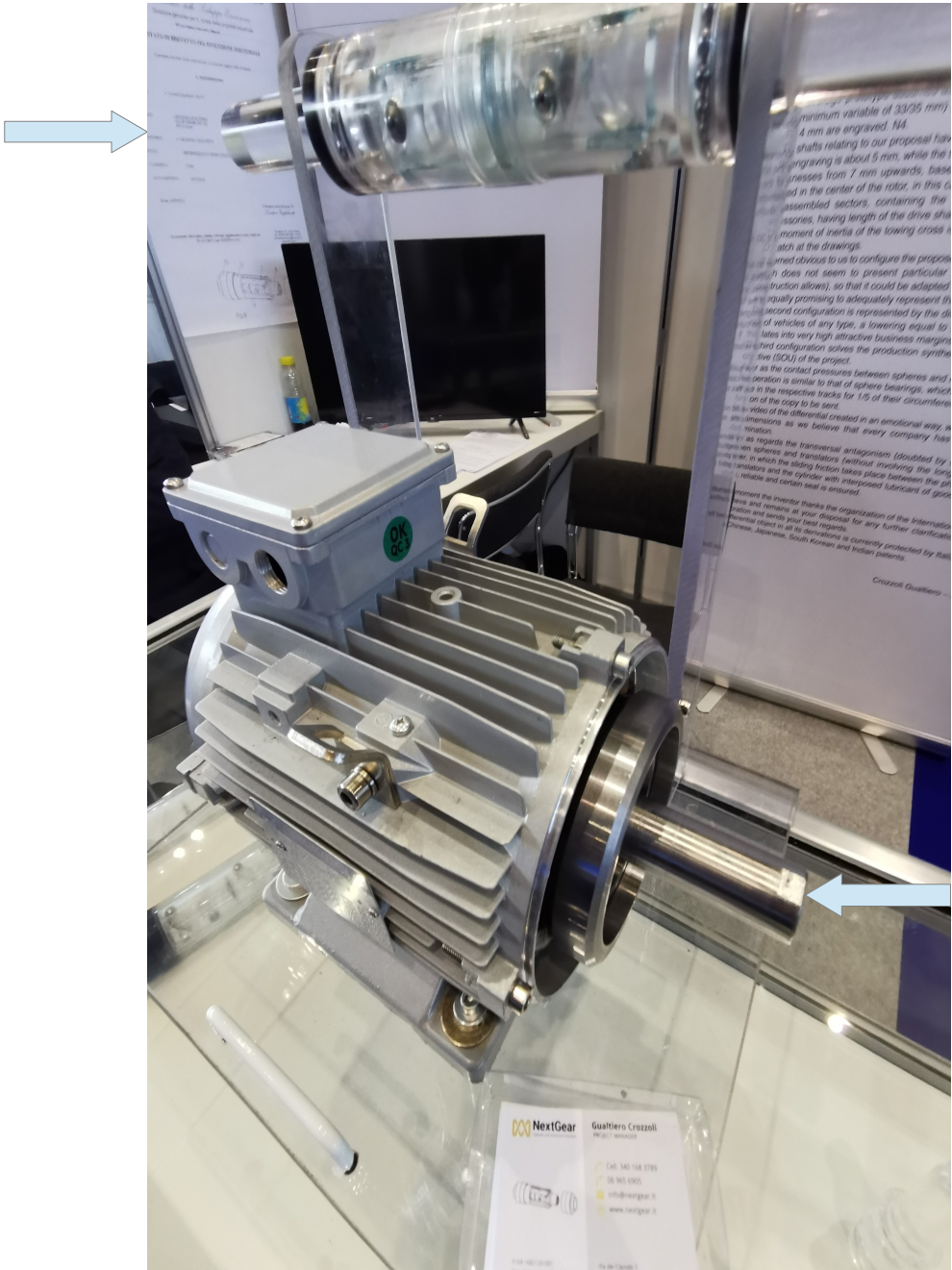


View of the differential integrated in an electric motor

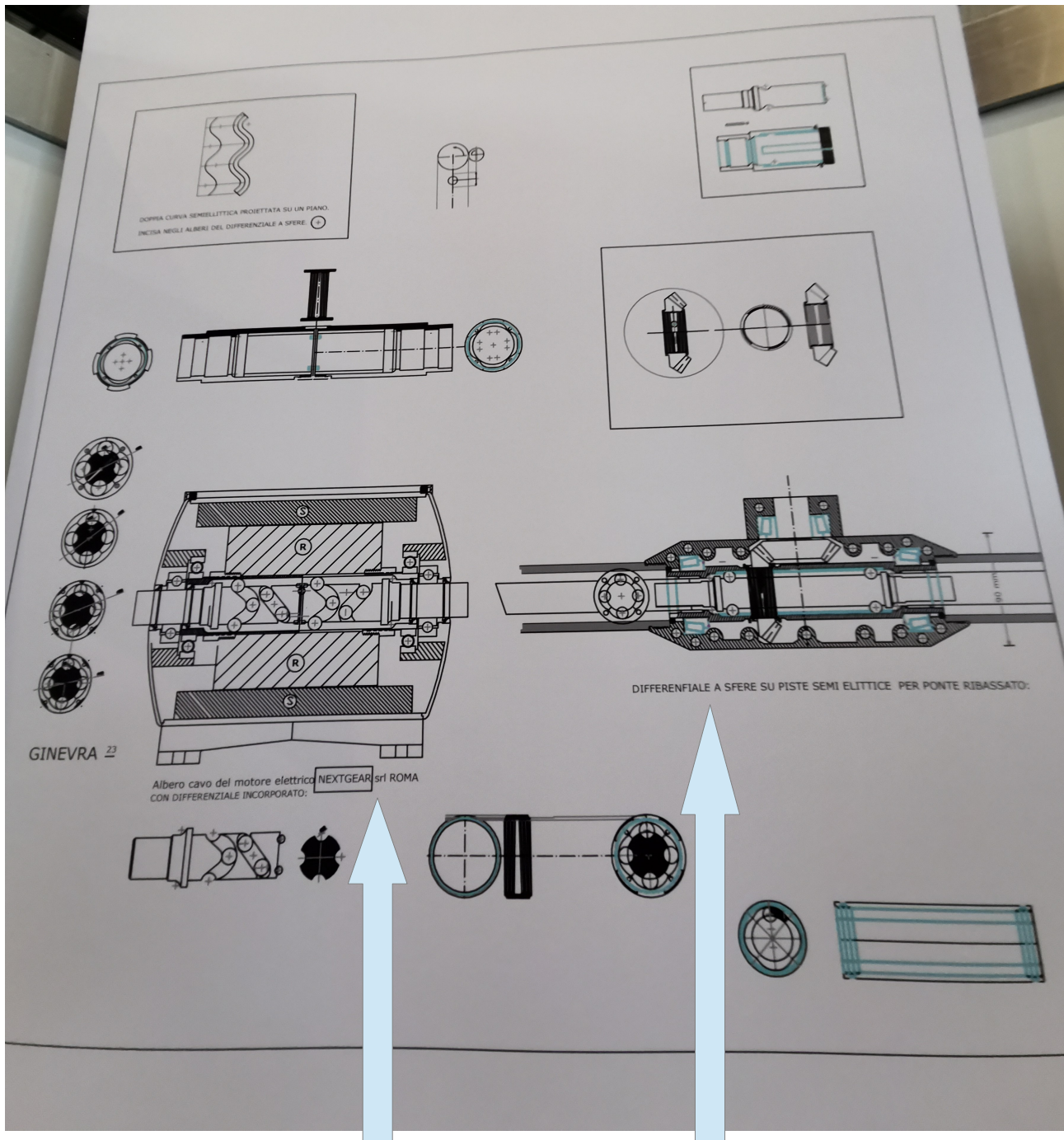
The differential can be integrated in any electric motor, as shown in the following picture. We can see on each side the outside axles.



Side view of the differential axle



Open view of the use of the differential on electric motor and on a rear-front axle :



Open view « differential » on electric motor

Open view « differential » applied to lower rear or front axle

Patent IT: N. 102020000015964 and USA – Europe – China – India – South Korea - Japan

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