



CRP Design Case study

Old fashion bicycle

The idea

CRP Technology joins together a high precision machining workshop and a rapid prototyping department which is in continue development in the research of the powders necessary for this type of technology. Since years the Windform[®] material has, in its various types, the advantage of having always better mechanical characteristics in order to be used as a functional component and not only as a "simple prototype".

The bicycle

The old fashion bicycle born with the intent of transmitting the integration that is possible between high precision mechanics and Windform[®].



Fig.1 - Old fashion bicycle

The working scheme used is an epicycloid gearing with final transmission ratio of 1:1,28. This mechanism, and in general the gears, need precise connections for the correct transmission of the motion without malfunctions. The correct working of the system, wholly realized in Windform[®] XT, confirms therefore the possibility of making functional prototypes with this technology.

In detail

The pedals are connected directly to the upright which, rotating, moves the intermediate wheel gears which realize the final transmission ratio making the bicycle wheel rotate. The central wheel gear instead is fixed and integral to the fork.



Fig.2 – Particular of the system of transmission of the motion.

To better comprehend the functioning you can see the constructive project in fig.3.

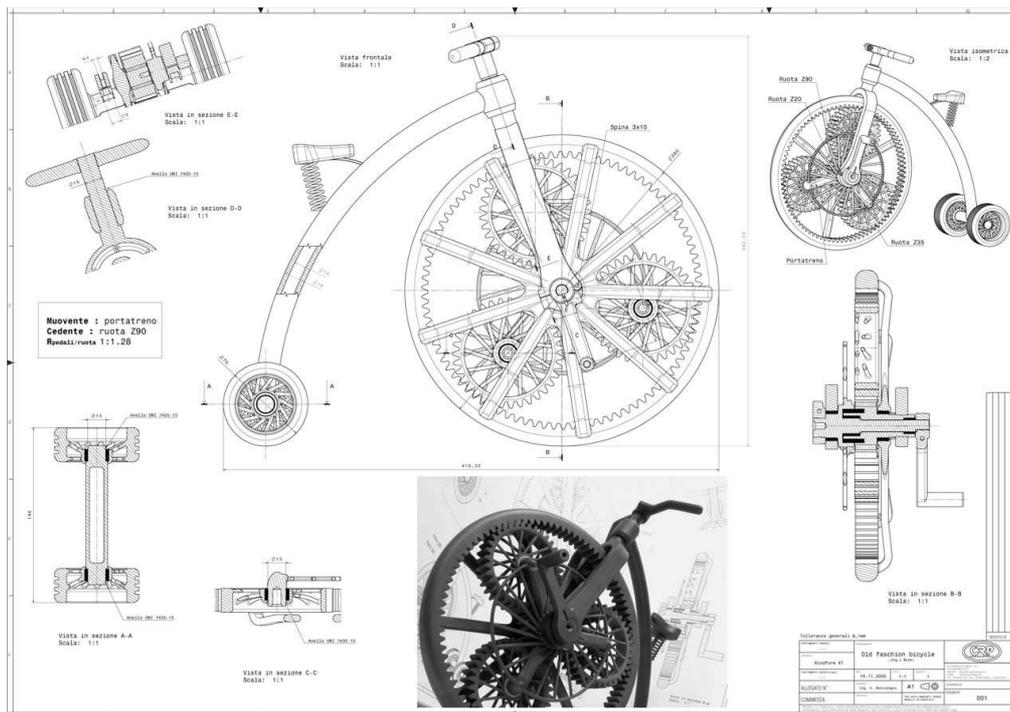


Fig.3 - Constructive table

In the B-B section the functioning of the mechanism can be easily comprehended. As you can notice there are 2 concentric axles. The first one is the pedal axle that moves the PORTATRENO and the other bigger one is the axle integral to the fork, fixed, which supports the central wheel gear. In full black are underlined in the table the bearings with auto lube bushings inserted with interference in the Windform[®] bearing housing.



In fig.4 it is possible to notice, in a gold colour, one of the 3 bushings of the mobile wheels positioned on the upright.

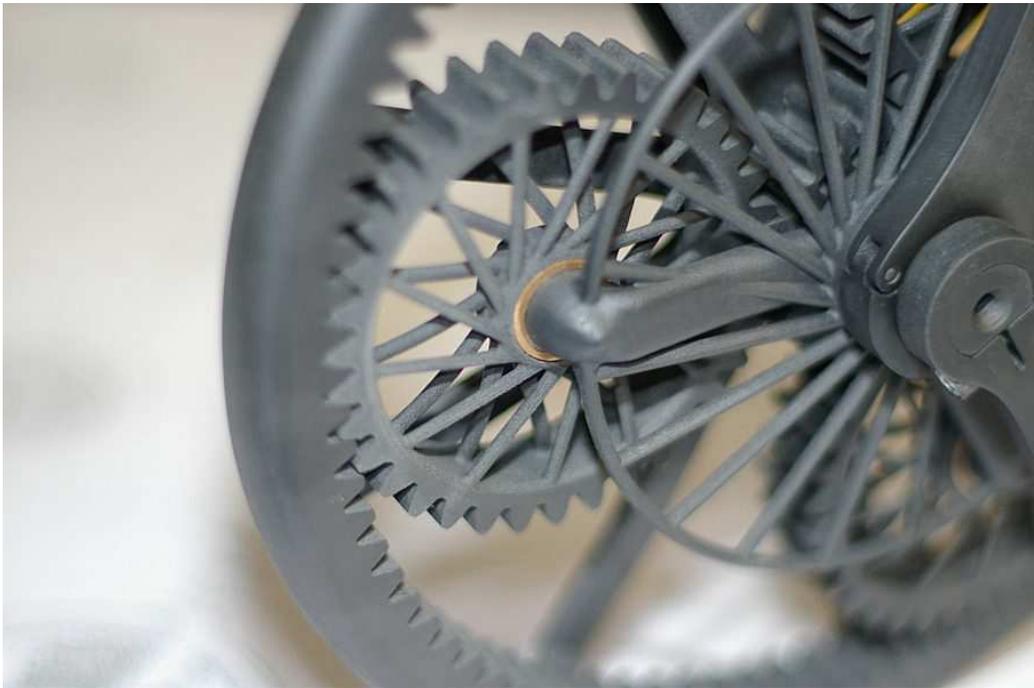


Fig.4 – Auto lube bushing.

The driving wheel complex is then assembled on the vehicle thanks to the detachable housing of the fork fixed with an M5 socket head screw and thread extracted directly on the Windform piece through tapping. (fig.5a/b/c)





Fig. 5a/b/c – Front wheel assembling system. To be noticed the blocking system of the wheels on the axles through snap ring.

Both in figure 4 and 5 you can see the fixing system of the pedals on the central axle through connection male/female with fixing screw and thread extracted directly on the Windform piece.

The rear axle presents the same scheme of the front one concerning the fixing and the connections. The rear wheels have an auto lube bushing assembled on the Windform piece with interference while the shaft has a groove for the snap ring which fixes the wheel. (Fig.6a/b)

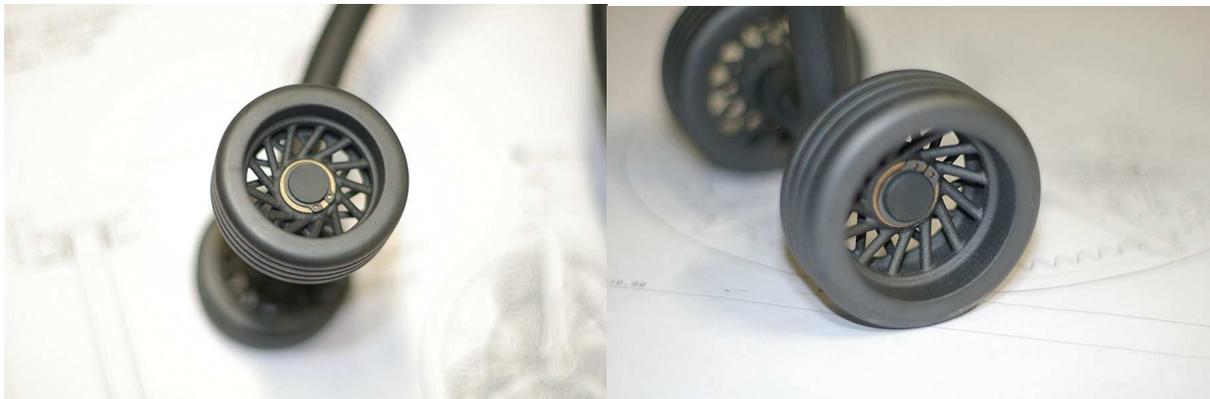


Fig 6a/b – Rear axle.

The steering system can be seen in the D-D section of the table (fig.3). It is realized without bushing, with a ledge at one ending of the fork rod and a groove for the snap ring at the other. The handlebar follows the same assembling scheme of the pedals; it consists in a connection male/female fixed with a screw and thread extracted directly on the Windform[®] piece. (Fig.7)



Fig.7 – Particular of the steering.

Finally to underline subsequently the properties of the new Windform[®] XT, a spring under the seat has been realized and can be really compressed without braking. (Fig. 8).



Fig.8 – Seat spring. Thanks to the excellent qualities of the new material the spring can be compressed without braking.