

From the Belgian Looping Process to the first Al CCR Rod Line

For the benefit of our affectionate readers, we have introduced in our Properzi Tech News Magazine an Historical Section with the purpose of illustrating the most significant milestones that have transformed the non ferrous rod industry from an antiquated one to the modern one of today.

To those who have been in the wire rod industry for many years, the photo below will certainly recall the old times when the rod was produced starting from wire bars and using the dangerous technology of Belgian Loop rolling mills. For our younger readers, we would like to provide a summary of this technology and explain how and when the ingenious invention of Mr. Ilario Properzi (1897-1976) sparked a second “Industrial Revolution” allowing the rod and cable industry to reach unimaginable targets. The rod production technology, prior to Mr. Ilario Properzi's invention, required the wirebars to be heated and then rolled by the Belgian Looping trains, thus obtaining only 100/150 kg coils that had to be welded together to be drawn. Further difficulties included the need for acid pickling to be used when copper rod was produced and the instability of the rod quality, which varied along the length of the same coil. The “starring” of this manual operation was the professional character called the “Serpentatore” in the Italian Language. In the English language this profession was referred to as “looper” (looping rolling mill operator). The looper's job was to catch the rolled bar with big pliers as it came flying from the rolls of a previous roll stand and to insert it into the subsequent roll stands. The rod needed to be turned 180 degrees which required great personal skill, particularly in the case of the smaller and subsequently higher speed rod. It was obvious that each day the loopers were risking much more than that of the Formula 1 pilots.

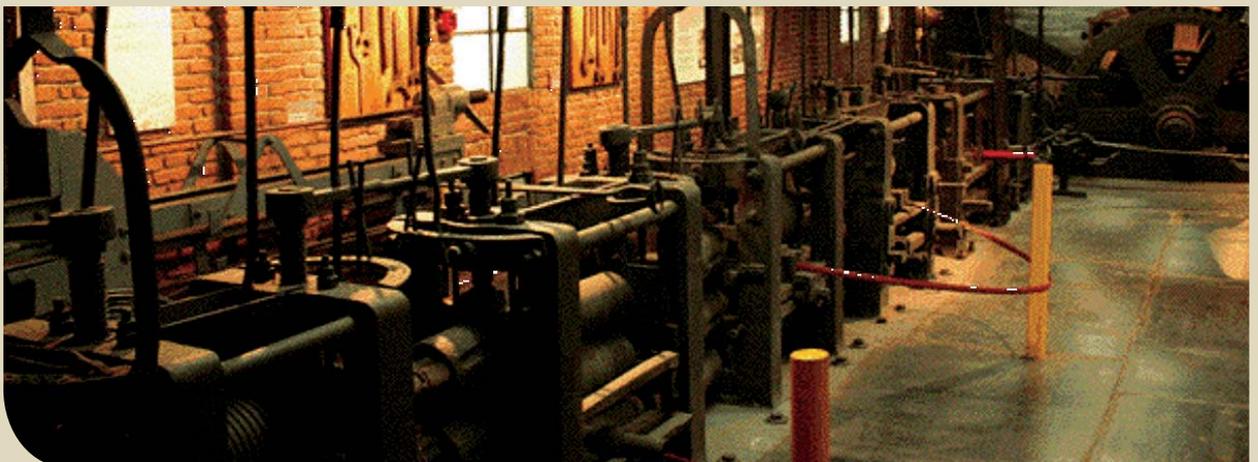
So, we have seen that the method of producing rod (aluminium or copper) with the available technology of the time, that of the Belgian Looping rolling mills, had several disadvantages. These included the impossibility of directly transforming the molten metal into rod, the non-homogeneous characteristics of the rod and the limited weight of each coil.

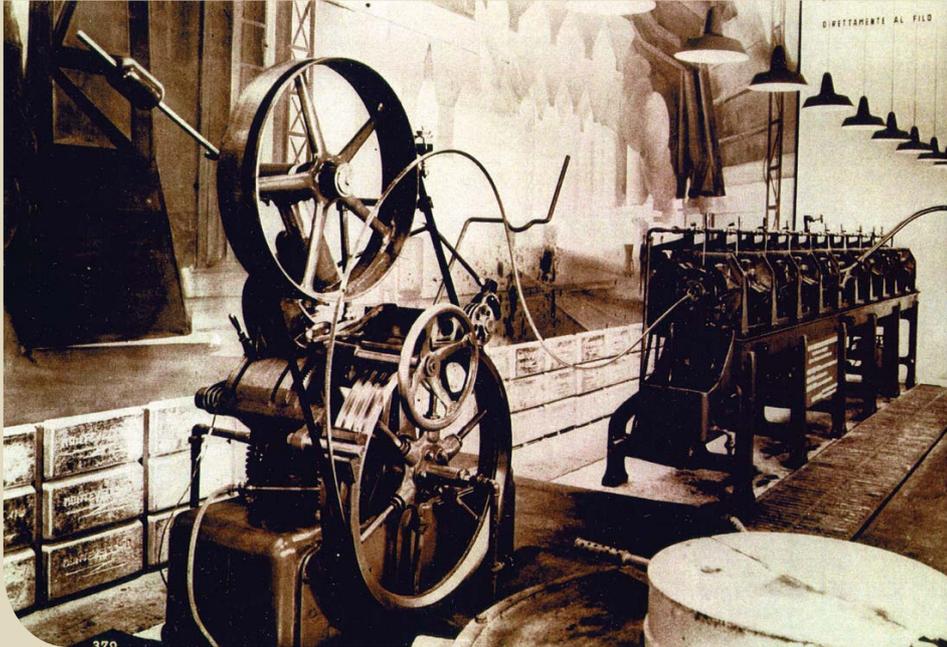
In 1947 Ilario Properzi registered his first Italian patent for the continuous casting and direct rolling (CCR) principle used in the production of non-ferrous metal rod, and the Continuous-Properzi Company was established with the mission of designing and manufacturing continuous casting and rolling systems.

In 1949 the “Properzi method” was successfully applied to aluminum production: the transformation from molten metal to rod took less than 2 minutes!

The first rod producers to purchase such plants (1949-1950) included Aluminum Wire & Cable, Imperial Chemical Industries, Swansea (Great Britain), Montecatini (Italy) and Pechiney (France). These advanced industries made a great contribution to the technological perfection of the method, particularly from the metallurgical side.

Typical Belgian Loop Mill

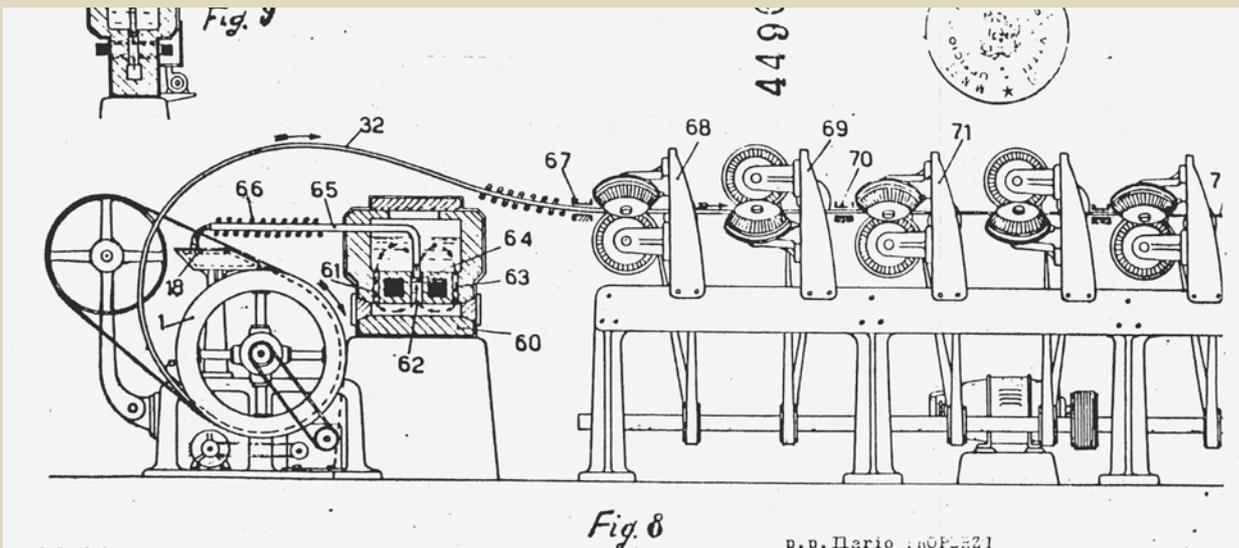




Lambretta's Advertising

The younger readers may find it difficult to understand or even imagine the technology of fifty-sixty years ago without PLC and HMI. Perhaps, even more difficult is to imagine themselves traveling on roads with almost no cars, just a few Lambrettas (scooters) and above all, without a cell phone!

It may be interesting to review the equipment invented by Mr. Properzi. The Properzi continuous casting and rolling system was probably the first in-line plastic casting and rolling system to find an industrial application which paved the way for those who later studied other processes and procedures for different metals and different products.



Original patent given to Mr. Ilario Properzi (1947)

As you can see in the picture above, the casting machine was made of a wheel, if not from a bicycle we can say from a handcart, whose edges formed a groove that was covered by a steel belt for 180° of its circumference. The belt was tensioned by a second wheel placed over the first one. The metal was poured between belt and groove through a nozzle while the flow of water cooled the rotating mould; the effect was to solidify a continuous bar having a semi-triangular shape and limited cross section (smaller than 200 mm²).

Yet, one of Ilario Properzi's most brilliant concepts was the immediate transition of the still hot bar directly through a series of rolling stands, each having three rolling cylinders. This 3-roll configuration, which allows precise control of the overflowing of the material during the process, is still being used in Continuum-Properzi S.p.A finishing mills today.

The first industrial line for the production of lead was presented at the Milan Fair in 1948. Later, this line was exhibited at the "Leonardo da Vinci" Science and Technology Museum in Milan (Italy) as a realistic example of pioneering technology that completely transformed the non-ferrous metal rod industry, thereby allowing unimaginable and extraordinary developments to come about in the transmission and distribution of electrical energy.

The Properzi company had already won the admiration and respect of world leaders in the field of aluminium during the decade 1950-1960 when, after much effort, trials and sacrifices, it was ready to conquer the copper rod market as it now had the resources of a middle-sized company. Not without many trials and tribulations, the direct continuous casting and rolling technology was extended to the production of copper rod in 1963. Stay tuned as this adventure will be continued in our next issue of Tech News.