

Thanks to the FIFA World Cup 2010 in South Africa, something that is normally overlooked is once again in the spotlight: the ball. Apart from the vuzelas – in the last few weeks maybe the most talked about thing in the world – the main protagonist is the ball itself. And this ball flutters (as it always does). Its production is high tech: both the materials and the way the patches are stitched together are closely-guarded secrets, protected by patents. In short, *every ball is different*.

*And every ball is the same*. If you take a closer look at these balls, you'll find an important piece of information printed on them: Size 5. It was the English Football Association in the 1870s that decided the ball had to be spherical with a circumference of 27 to 28 inches. This is why today every official football has the same normalised size.

But what is the history behind this development? Well, all footballs do have something in common: they have to hold a certain air pressure. And on the outside, they have to withstand quite different forces, such as high pressure and abrasion. They also have to be water resistant.

For the moment, we are mainly interested in one thing: containing the air. For quite a long time in the history of kicking balls, people used pigs' bladders. As long as this was the case, each product was (as you can imagine) of a different size, because *nature doesn't have standard sizes*. Obviously, this problem would have had to be solved before a modern mass production of footballs became feasible. An artificial bladder was needed: an inner layer, made from man-made materials, and of a standardised size.

Moving on: was Dingler's »Polytechnisches Journal« interested in the latest technologies as far as football is concerned? Well, in a certain way, yes. Obviously, we won't find anything on this topic if we search for »Fußball« (football) or anything similar. On the other hand, we might indeed be successful if we just knew the material, which had to be treated or even created to produce the aforementioned artificial bladder.

To cut a long story short: apart from trains, steam engines etc. the 19th century was also a century of developments in insulating materials. These materials were needed, for example, for telecommunication cables. The crucial keyword here is india rubber or caoutchouc (German: Kautschuk). And searching for »Kautschuk« will indeed score hits in Dingler's Journal. In Vol. 69 of 1838, we find an article titled:

»Verbessertes Verfahren dem Kautschuk seine klebende Beschaffenheit zu nehmen und ihn zu bleichen, worauf sich Charles Goodyear in New York ein Patent ertheilen ließ. Aus dem Mechanics' Magazine, No. 777.«

Even if you don't speak any German, this makes everything a lot easier, since we have found the source »Mechanics' Magazine«.

In »Mechanics' Magazine« issue no. 777 of the same year (1838), we find the corresponding article starting on page 221:

»Divesting caoutchouc, or india rubber, of its adhesive properties, and also of bleaching the same, and thereby adapting it to various useful purposes. Charles Goodyear, New York.«



Fig.: Illustration of the remains of Goodyear's first football, 1863.

India rubber, divested of its adhesive properties. Well, what has this got to do with the production of footballs? It has, in the long run. Charles Goodyear's corresponding US-patent of 1837 (No. 240) is the very basis of one of his later inventions. And although most sources mention the year 1855, when it comes to dating the first vulcanized rubber footballs ever – designed by Charles Goodyear – the corresponding patent application – *Improvement in making hollow articles of india-rubber. US 5536* – is actually dated April 25, 1848:

Quoting the original:

»In the making of hollow spheres and various other hollow articles of such vulcanized rubber I employ the rubber in sheets, and in the state in which it is just previous to being baked or exposed to heat, as aforesaid, the rubber being then in a tacking or adhesive state. I cut it into such shape or shapes as will enable me to lay it in a mold of the article to be produced, and so as to cover the whole internal surface of said mold, and so that the adjacent edges of the piece or several pieces so laid in the mold may be laid close together, or so as to touch or nearly touch one another. To form a hollow ball, the pieces may be cut or shaped like the four quarters of an orange-peel.«

Having a closer look at the illustration above, you'll find that this »orange« in fact was shaped out of 4 quarters. And after a long history of using 32 patches, *Jabulani* – the official ball of the FIFA worldcup 2010 – is made of not more than eight pieces and at least in this respect by tendency collates with Goodyear's original.