

NEW POSSIBILITIES OF ELECTRODISCHARGE PROCESSES AT A BAR-CODING OF NEW INDUSTRIAL PRODUCTS

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Abstract : In article it is briefly stated the history of creation of industrial product bar-coding and the need is proved to code not a product class but an individual product that will make it possible to force smoothly fringing goods out from trade.

Key words: bar-cording, identification, individual bar code.

The history of bar-coding creation is directly associated with a need of a quick cash calculation of the bought industrial products.

The idea later embodied in the term of bar code was proposed in 1932 by a small group of students under the leadership of Wallace Flint who were engaged a rather promising project in the Higher School of Economy and Production Organization at the Harvard University. According to the project there was developed a solution for trade which provided a selection of goods from a catalog by a punched card corresponding to each goods. The punched cards chosen by a buyer should be given to a manager who put them into some reading device. Then the system automatically selected the goods from a warehouse and brought it to the control and cash point. The buyer received an account, and the corresponding alterations were introduced into inventory records.

In 1948 Bernard Silver, a post-graduate student of Drexel Institute of Technology (Philadelphia) casually heard that the president of the local network of food shops asked the dean of one of the faculties to elaborate a system of an automatic reading of information on products on the control and cash point. Silver told about the president's request to his friend Norman Joseph Woodland, who was twenty seven at that moment, a post-graduate and professor of Drexel Institute. Woodland was greatly interested and immediately started to solve the problem.

The first solution proposed by Woodland was to use a codegram applied by ink luminous in ultra-violet light. Woodland and Silver designed a working device; however there appeared some difficulties connected with the ink instability, besides the process of codegram application was rather expensive. Nevertheless, Woodland was still sure that the idea was feasible. He used some income from operations on the stock exchange, left the position of the Drexel Institute teacher and went to his grandfather to Florida in order to have more time and study that problem.

On 20 October 1949 Woodland and Silver submitted an application for the patent under the name "Method of classification and the corresponding device". The inventors described it as "the method of classification of products through an identification image".

It is stated in the majority of works concerning the history of the bar-code that the code elaborated by Woodland and Silver represented the so called "cat's eye"

a symbol consisting of a number of concentric circles. In spite of the fact that Woodland and Silver really mentioned such a symbol, the main symbolics was described as a certain combination of straight lines much similar to modern bar codes as well as UPC and Code 39.

The symbolics consisted of the combination of four white lines against a dark background. The first line denoted the date, and the position of the other three lines was constant in relation to the first line. Information was coded by the absence or presence of one or more lines. This combination made it possible to create 7 different classifications of goods. However, the developers noted that using additional lines one can code more classification groups. With the help of 10 lines one can code 1023 classification groups.

On October 7, 1952 Woodland and Silver got the patent [1]. The main property of such a bar code is the conformity between the price and the goods class.

At present it shows good results the global international article numbering system founded in 1997 on the basis of the European Article Numbering Association GSI and North American Uniform Code Council (UCC) and named as EAN bar code. The functioning of this code is realized through national organization of GSI. For instance, in Russia it is UNISCAN/GSI. National organizations provide every enterprise a unique identification number. The system of EAN (bar-coding of goods) is not obligatory and is realized on a voluntary basis.

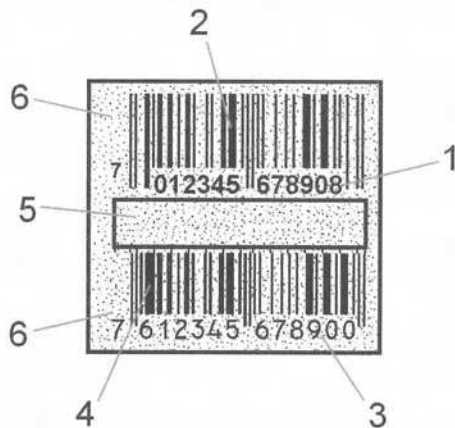
At a certain stage the requirements to the bar-coding increased; it became necessary to recognize not the class of goods but an individual industrial article. It is a problem of higher level both for the manufacturer of industrial products and the salesman. Does the salesman needs such a bar-code? Most likely, not. It is a buyer who needs such a bar code, and, as we know, he is always right.

Let us image a simple situation. There are 10 similar cups with a blue edge on the shelf. Five of them are produced at a legal enterprise according to all the process requirements, and the other five cups are produced at a shadow enterprise using a blue paint containing, say, mercury compounds. When buying the cups made at the legal factory a man will successfully continue his life cycle, but with the infringing goods he can suddenly die in 2-3 years for some unknown reason. The solution of this problem, directly connected with the industrial safety, is

very important in the case of selling drug products. The proposed bar codes automatically force out from trade the fringing industrial articles. To introduce such an approach a producer factory should create a database of individual bar codes and transfer of it into the trade network.

The philosophical underpinning of the necessity to individualize industrial articles is presented in [2].

Fig. 1. The bar code having a property to individualize an industrial article.



In Fig. 1 there is shown the proposed individual bar code with the protected information. It contains the main digital 1 and bar 2 codes. Besides, it contains individual digital 3 and bar 4 codes. Formation of nonreproducible picture 5 is carried out through various approaches, in particular with the help a spark discharge [3-4] or on special

nanopaper [5], produced by a preliminary introduction of nanopowder additive to the paper mass with the following manufacturing of nanopaper sheets and simultaneous fixation of the location of nanoparticles 6 relative to each other both in the space of the nonreproducible picture and between the stripes of main 2 and individual 4 of the bar code.

It was estimated mathematically that the probability of repetition of location of nanoparticles relative each other is almost zero. The process of the identification of an individual bar code is reduced to the comparison of nonreproducible picture 5 on the bar code with a similar picture in the database. If nonreproducible pictures 5 do not coincide an industrial article is assumed a fringing one.

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