Firmware unit "Vij-5A" for vehicle (automobile) identification number (VIN) investigation

Application

Criminalistic investigation of automobiles with the purpose:

- identification of their number authenticity;
- restoration of original numbers in case their relief stands out insufficiently because of corrosion, lacquer coating etc.;
- restoration of original numbers in case they are proved to have been altered;
- technical expertise of the auto documents.

Extra application:

general tracing investigation and relief/stress defectoscopy of surface layer of ferroalloy parts.

Method

- reproduction of induced stray magnetic fields of the object under investigation at an intermediate magnetic carrier;
- magnetic-optical visualization (MOV) of magnetic copies and induced magnetic stray fields of the object under investigation by Faraday effect appearing in crystal bismuth garnet ferrite films;
- outputting and processing of object images obtained by above-mentioned methods into a personal computer (PC). Research of obtained images by means of the software: measurement, comparison, etc.

Fig.1. General view of MOV.

Fig.2. User interface window.

Support

Full hardware package

- <u>Off-line operative unit for visualization upon the intermediate magnetic tape</u>
- <u>Tackles set (box) for magnetic copying</u>
- <u>Spectral magnifier for examination of the documents</u>
- Unit for magnetic-optical and optical visualization:
    - external magnetic-optical head
    - external optical head
- Electrochemical etching unit
- Unit for magnetic powder visualization
- Unit for whirling-current defectoscopy
- Tools and tackles set.

Minimal hardware package: –<u>underlined positions</u>
Software

- Image input and processing
- Automatic stitching of image fragments
- Image handing
- Storing and printing

Methodical

- Research procedure of MOV
- Manual book

Characteristics

- Compartible with Windows-95, 98
- Image file format - BMP, PCX, GIF, JPG
- Material of objects to be investigated by MOV- ferromagnetic alloys
- MOV spatial resolution - not worse 5 μm.
- Number-plate input time - about 0,5 min.
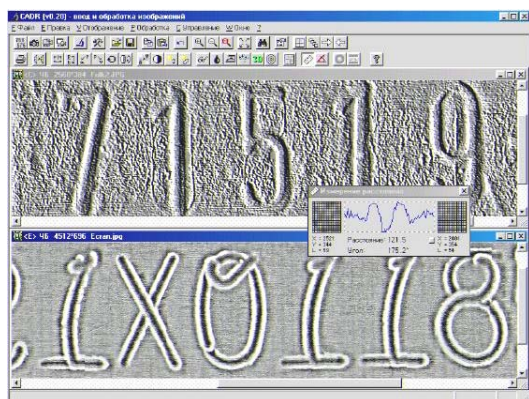
Specifications:

- Joint operative forensic research both automobile, and accompanying documents

- The efficiency of realization of researches by a method MOV in a combination to compactness of hardware, power autonomy and opportunity of use of the electronic guides and databases, allows application in conditions of the linear control

- The not destroying technology MOV allows to keep integrity paint cover of the automobile in interests of the owners and gives an opportunity, if necessary, to supply valuable researches with other methods including chemical research of uniformity paint cover

- Small expenditure of materials at MOV. The magnetic copying on the intermediate carrier provides its repeated use. At the same time there is an opportunity of creation of a magnetic copy of object for documenting

- High effectiveness of results of researches by a method MOV allows to find out attributes inaccessible to traditional methods, rusts, for example taking place in a superficial layer.

Implementation

The workstation "Vij-5A" is development of base model "Vij-4" and at the present moment passes laboratory tests. The workstation "Vij-4" successfully have passed approbation and are maintained in forensic divisions of the Ministry of Internal Affairs and Ministry of Justice of Ukraine, and also - in Polish police. The used technique of researches is authorized and is recommended to application by the Ministry of Internal Affairs and Ministry of Justice of Ukraine. The experience of workstation operation has shown their high efficiency (the MOV figures are given below as a result of practical work and applied in the photo-tables of experts' reports).
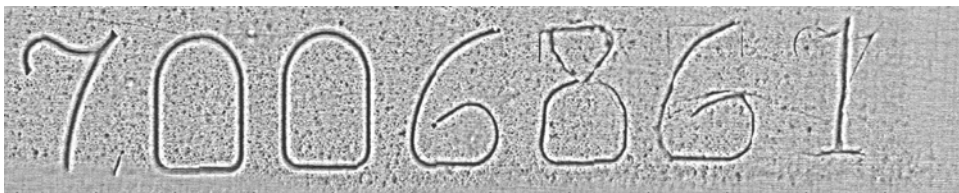

Fig.3. MOV of a fragment of a number platform the chassis of the automobile with fragments of primary numbers (... 7006357), changed by a method of primary polishing, secondary stuffing of numbers by a handicraft way (number platform located on the chassis of the automobile was strong corroded)
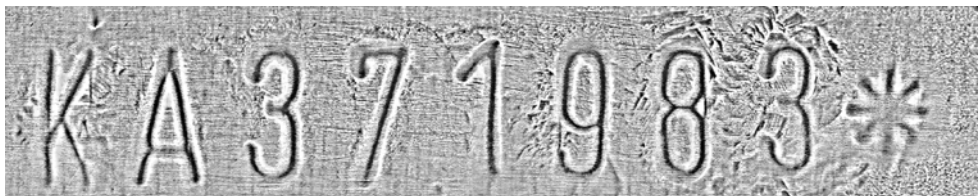

Fig.4. MOV of a fragment of a number platform of a body of the automobile with fragments of primary numbers (...? A371097), changed by a method cold stuffing (paint cover was not removed)

Fig.5. MOV of a fragment of an automobile body number platform with fragments of primary numbers (... 1EZRK007176), changed by a method of filling the crosspieces by fusible metal (paint cover was not removed).

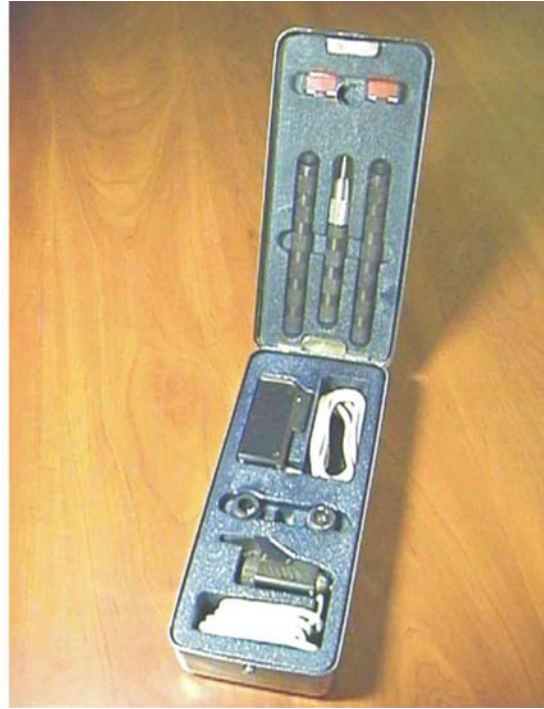*The development was carried out on an initiative basis together with firm "REGULA".*

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Peripheral hardware units of firmware "VIJ 5A"

Unit for magnetic powder visualization

Unit for magnetic-optical and optical visualization

Electrochemical etching unit

Unit for whirling-current defectoscopy