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Facsimile Signatures Produced by Gelatin Transfer Duplicator—Recognition and Identification

REFERENCE: Gencavage, J. S., **"Facsimile Signatures Produced by Gelatin Transfer Duplicator—Recognition and Identification,"** *Journal of Forensic Sciences*, JFSCA, Vol. 31, No. 1, Jan. 1986, pp. 106-116.

ABSTRACT: A gelatin transfer duplicator can be used effectively to reproduce facsimile signatures resulting in forgeries of a reasonably good quality. However, an examiner of questioned documents who has a comprehensive understanding of the various stamping devices used in producing legitimate facsimile signatures should be able to recognize the fraudulent reproductions. It is also possible to identify the fraudulent reproductions with the matrix materials used in the reproduction process. An explanation of the process utilized in the examination and identification of these forgeries is furnished.

KEYWORDS: questioned documents, signatures, forgery, cachets, facsimile signatures, stamping devices, gelatin transfer, fraudulent reproductions, recognition, identification

The gelatin transfer duplicator can be used effectively in producing forged facsimile signatures. The finished product is not a perfect reproduction, but neither is any forgery regardless of the manner in which it is prepared. Facsimile signatures are widely used and can be reproduced by this method resulting in endorsements which are readily acceptable by experienced members of the business community. This fact alone merits the time and effort to explain how these forgeries are prepared, detected, and identified. To distinguish between a genuine facsimile signature impression and a forgery, it is necessary that the examiner be familiar with the various methods used in producing the stamps which serve as the vehicle of the facsimile signature impression.

Legitimate facsimile signature stamps are produced in a variety of ways using various materials and techniques. The impressions produced by these stamps are not signatures. They are impressions of an individual's signature, and as impressions, they are not difficult to distinguish from normal signatures. However, to distinguish a genuine facsimile signature impression from a forged facsimile signature impression, the examiner should have a comprehensive knowledge of the various methods used in producing legitimate stamps and the inherent features of stamped impressions. To acquire a comprehensive knowledge of this subject, the examiner should be familiar with the works of Purtell [*1*], Casey [*2*], Levinson and Perelman [*3*], and others.

Since this paper will deal mainly with the forgery of facsimile signatures by gelatin transfer and not with the various methods by which the stamping devices are produced, the author

Presented at the American Society of Questioned Document Examiners 42nd Annual Conference, Nashville, TN, 20-24 May 1984 and at the 37th Annual Meeting of the American Academy of Forensic Sciences, Las Vegas, NV, 12-16 Feb. 1985. Received for publication 4 Aug. 1984; revised manuscript received 18 March 1985; accepted for publication 27 March 1985.

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has attempted to condense a variety of information concerning facsimile signatures into categories based on the type of material used in producing the stamping devices which are most commonly encountered.

Materials and Inherent Features

Facsimile signatures are generally produced using two types of materials: those of pliable substance, such as rubber and rubber-like materials, and those using rigid materials, such as metal, plastic, and so forth. The stamps produced of these materials generally display a variety of discernible class characteristics which should enable the examiner to recognize the type of material he is dealing with.

Facsimile signatures produced of pliable materials are commonly referred to as "rubber stamps." These stamps are generally applied manually and will often exhibit a number of class characteristics that are common to the type of material used. The pliable stamp impression, if relatively new, may display a pock-like or dotted line texture inherent from the porous material of which it is made, or it may exhibit indications of shadowing caused by rebounding or rocking during the application process (Figs. 1 and 2).

Also, the pliable stamp will not emboss or indent the paper; it will result in a kiss impression which will lay the ink upon the fibers of the paper with no squeeze out [*4*] in the outline of the impression. The paper surface may even be seen through the ink depending upon factors such as: the pressure exerted in application, porosity of paper, type and viscosity of inks, and so on. All of these factors must be taken into consideration during the microscopic examination.

Facsimile signatures produced with rigid materials may be encountered in the form of hand stamps or mechanical signature printers, or they may be an integral part of a printer's

FIG. 1—*Note the dotted line texture of a relatively new rubber stamp.*

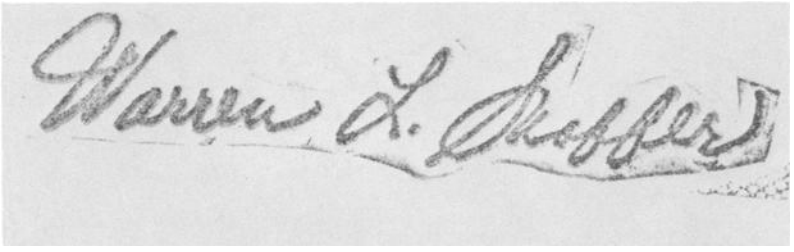

FIG. 2—*The ink in the fringe area is a result of rocking and rebounding of the pliable stamp during application. The irregular line below the signature is part of the signature base. The dotted area at lower right is a portion of the cushion.*

layout. Regardless of the vehicle used to transport the stamp, the impressions produced with rigid materials also exhibit class characteristics. For instance, a facsimile that is produced and used similar to a type slug, and those used in mechanical signature printers, will exhibit class characteristics similar to those of letterpress printing. The impressions should emboss or indent the paper to a degree dependent upon the pressure exerted during the printing process; these class characteristics should be apparent through close examination. In addition, the examiner should be able to recognize the squeeze out or halo effect appearing in the outlines of the impression (Fig. 3).

Handstamped facsimile signatures produced from rigid materials will also exhibit some of the previously mentioned features such as slight irregular embossing, or impressions, irregular squeeze out, and uneven or smeared inking. The aforementioned information deals with factors that should assist an examiner to recognize a genuine facsimile signature produced from pliable or rigid materials.

Preparing the Forgery

There are many techniques by which a facsimile signature can be duplicated. The only thing necessary is a model. The model can be in the form of the original signature, the template used to produce the original stamp, or even a facsimile impression produced from the stamp. Modern technology would have no difficulty in producing a stamp just as acceptable as the original. However, it is not necessary to reproduce the actual stamp in order to execute a reasonably good quality forgery of a facsimile signature. The author has had the opportunity to examine and identify a number of forged facsimile signatures which were produced with the aid of a gelatin transfer duplicator. The duplicator used was a Hekto-Printer®[2] (Fig. 4).

The Hekto-Printer, complete with supplies, consists of a printer tray; a pouch of gelatin compound; duplicating carbon paper in five colors—purple, red, green, blue, and black, all consisting of aniline base dye; Heyer Super-Duplicator Paper (for making masters); a specially treated Hekto-Printer Cover; a set of cartoon images; and detailed instructions (Fig. 5). The side of the storage carton displays the following advertisement which appears to be an appropriate description of the product: "A HANDY INEXPENSIVE DUPLICATOR FOR ALL PURPOSES—ALL AGES."

According to a company representative, the Hekto-Printer is the only gelatin transfer duplicator presently on the market, and it was recently sold to Copy-Mex of Mexico City, Mexico, for manufacture in that country.[3] However, examiners should also be familiar with the

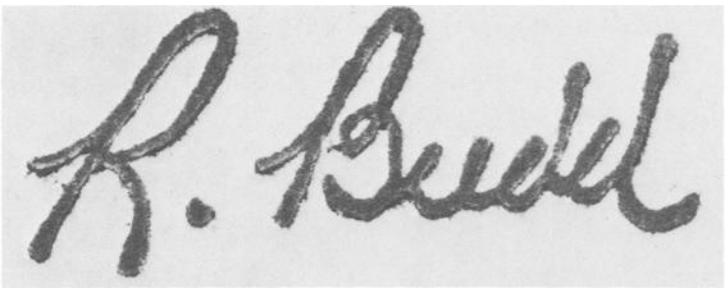

FIG. 3—*Squeeze out in the outline of the signature is characteristic of a mechanical signature printer using a rigid plate.*

[2]Hekto-Printer®, gelatin transfer duplicator manufactured by Heyer Inc., Chicago, IL.
[3]Interview, J. Nowak, assistant to vice-president, Sales, Heyer Inc., Chicago, IL, February 1984.

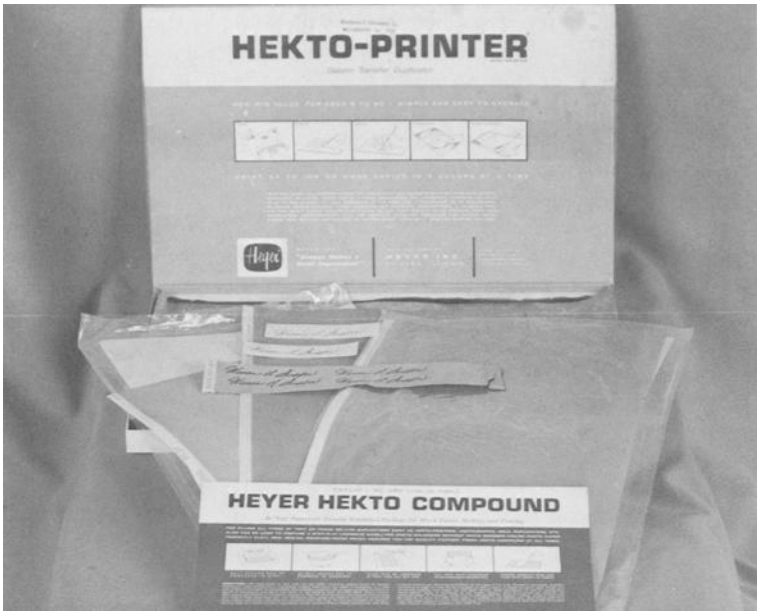

FIG. 4—*Photograph depicts Hekto-Printer which was actually used to produce forged facsimile signatures (signatures in photograph are for illustration only).*

FIG. 5—*New Hekto-Printer and contents.*

types of gelatin duplicating processes mentioned in the works of Harrison [5] in the section of "Hectograph Inks" and Hilton [6] on a gelatin and spirit duplicator known as a "hexagraph." In all probability, the components of these processes could also be used effectively in producing the type of forgery discussed in this paper.

Facsimile signatures produced with the gelatin transfer printer involve three basic steps. The first step involves placing a piece of duplicating carbon paper on top of the Super-Duplicator paper and then placing the model on top of the carbon paper. The model is traced over with a ballpoint pen, stylus, or other suitable instrument, transferring the carbon, and creating a matrix. The tracing procedure should be completed on a hard smooth surface similar to glass. Secondly, the matrix is placed in contact with the gelatin surface and smoothed out to prevent wrinkling and distortion. The matrix is kept in contact for a sufficient period of time (several seconds) enabling the aniline compounds from the matrix to be absorbed into the gelatin printer surface. The matrix sheet is then carefully peeled from the gelatin, and the copy is ready to transfer. The third and final step merely requires the selected document to be properly aligned over the gelatin surface and smoothed into place for a brief period of time (several seconds) enabling the facsimile signature to be transferred from the gelatin to the selected document (Fig. 6).

The process seems to have the ability to diffuse slightly the aniline base carbon, and the resulting copy is a reasonably good reproduction of the genuine facsimile signature that was used as the model. Of course, the quality of the finished product is directly related to the care that is exercised in preparing the traced matrix. However, even a matrix that is traced in a relatively careless manner probably would not make the detection of a forgery much less difficult because of the wide range of quality encountered in genuine facsimile signatures.

Recognizing the Forged Facsimile Signature

There are a number of factors that will enable the examiner to distinguish between a genuine facsimile signature and a forgery produced by gelatin transfer. A facsimile signature produced by gelatin transfer lacks the various features and class characteristics that are inherent in conventional facsimile signatures produced from stamps made of pliable or rigid materials. The gelatin transfer signature, when examined microscopically, will not be as

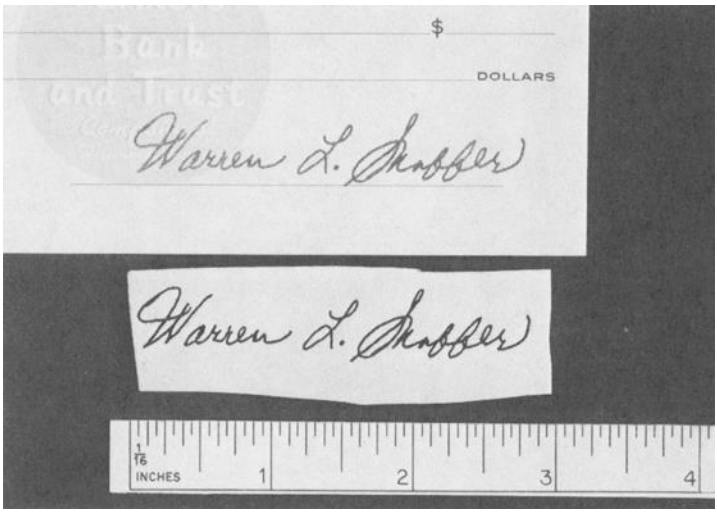

FIG. 6—*Matrix and resulting forgery. 1 in. = 25.4 mm.*

crisp and deep in color as the conventionally prepared standards. In addition, the standards prepared with contemporary black stamp pad inks, and black inks used in mechanical signature printers, are generally opaque to the infrared and vary in infrared luminescence. The gelatin transfer signatures are invisible to the infrared; however, they do luminesce not only in the outline of the signature, but also in the outline of the matrix which is used in placing the image on the gelatin base. The examiner should understand that the degree of luminescence may vary from bright to dark in both the questioned and standard facsimile signatures. This is due to the variety of compositions involved in inks, papers, and so forth and their reaction with each other, as explained by Hilton [*7*] and Sensi and Cantu [*8*] in their studies of infrared luminescence and how it is affected by various factors. The preceding information should further assist the examiner in recognizing a facsimile signature produced by a gelatin transfer duplicator (Figs. 7, 8, and 9).

Another point that needs clarification is the difference between gelatin transfer facsimile signatures and carbon traced signatures. This detail is clarified because the procedure used in preparing the matrix involved in the gelatin transfer process is nothing more than a carbon tracing of a model signature. In addition, the first few copies produced in the transfer process may be deceiving because of the heavier concentration of carbon being transferred. Therefore, the examiner must be aware of the features of carbon traced signatures and those prepared by gelatin transfer in order to distinguish between the two. This distinction should not be difficult under close examination. The examiner must remember that a carbon traced

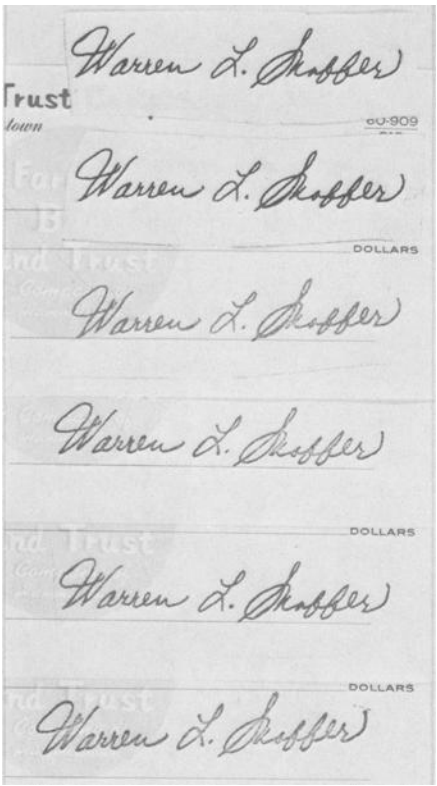

FIG. 7—*Normal photograph—the first and second signatures* (top to bottom) *are matrices used in preparing two of the remaining signatures.*

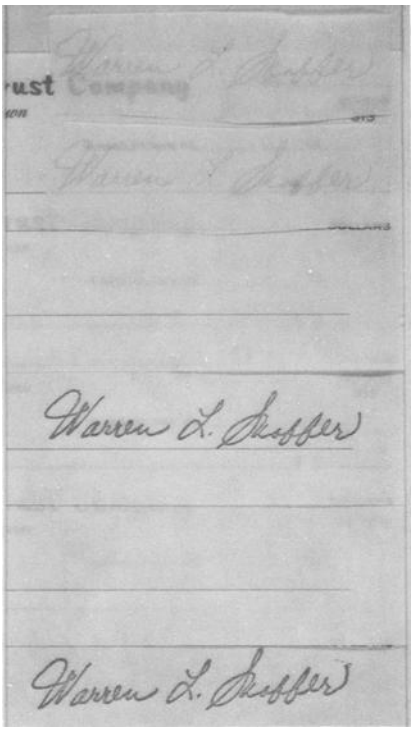

FIG. 8—*Infrared photograph reveals the genuine facsimile signatures.*

signature requires pressure from an instrument to transfer the carbon particles which form the signature outline. During the tracing process, the carbon particles are forced to become embedded within the fibers of the paper and are quite apparent under microscopic examination. Close examination should also reveal evidence of indentation in the outline of the traced signature.

As previously noted, the gelatin transfer process has a tendency to dye the fibers of the paper in the outline of the signature. Any carbon particles, which may be apparent on the first few copies, have a tendency to bleed into the paper or slightly dissolve and lay upon the surface. There will be no depth of penetration of the carbon particles because of a lack of instrument pressure necessary in carbon tracings. All of the aforementioned factors should assist the examiner in distinguishing between a genuine facsimile signature, a forgery produced by gelatin transfer, and a carbon traced signature (Figs. 10*a* and *b*, 11*a* and *b*, and 12*a* and *b*).

Identifying the Forgery with Its Source

The identification problem presented by gelatin transfer forgeries is one of identifying the forgery with the matrix used to produce the specific facsimile signature in question. The matrix used in the process will transfer the characteristics to the questioned document, and the identifying characteristics may be found at any location on the matrix.

There are basically two phases during preparation of the matrix where individual characteristics develop. First, as the model is being traced over the duplicating carbon paper onto the duplicator paper, distinct irregularities of an individual nature may develop in the for-

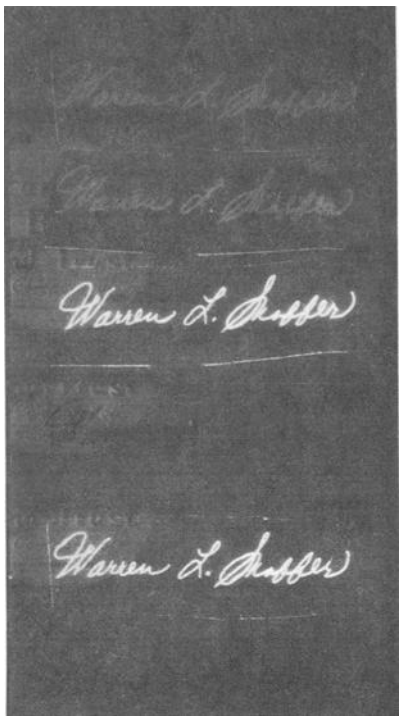

FIG. 9—*Infrared luminescence reveals the forged facsimile signatures and characteristics which are apparent in the outline of the matrix used to prepare each forgery.*

FIG. 10*a*—*Genuine facsimile signature (×10 magnification). The kiss impression of a genuine facsimile signature produced from pliable materials (rubber stamp). The ink lays upon the fibers of the paper. The crevices are not filled with ink and portions of the paper surface can be seen.*

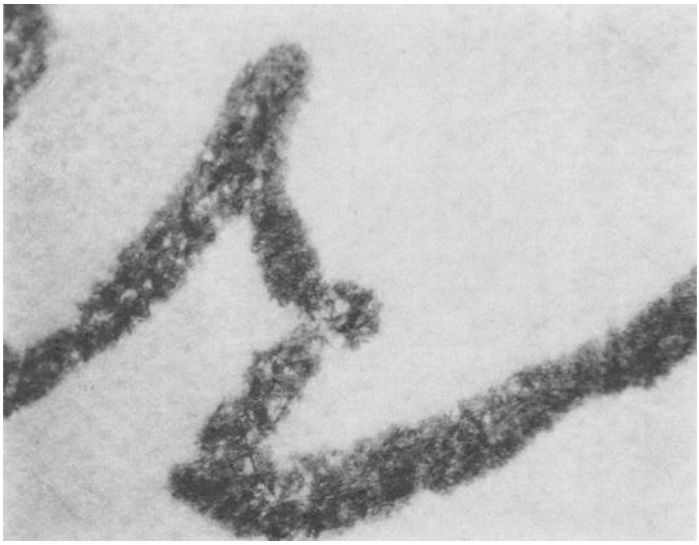

FIG. 10*b*—*(×20 magnification.) The features of a genuine facsimile signature are enhanced.*

FIG. 11*a*—*Gelatin transfer signature (×10 magnification). The fibers of the paper appear to be thoroughly dyed. The color is diffuse and not as crisp as the genuine stamped facsimile signature. The trash carbon particles carried over in the transfer process have a tendency to bleed into the paper or slightly dissolve and lay upon the paper surface.*

mation of the matrix signature outline. These characteristics should be readily located during a detailed and microscopic examination. Secondly, identifying characteristics may develop as a result of the manner in which the completed matrix is cut or torn from the remaining sheet of paper. These characteristics will be in the form of latent images observed during examination by infrared luminescence.

Regardless of where the identifying characteristics develop, they are transient and will be reproduced during the gelatin transfer process, enabling a questioned facsimile signature to be identified with the matrix from which it was prepared.

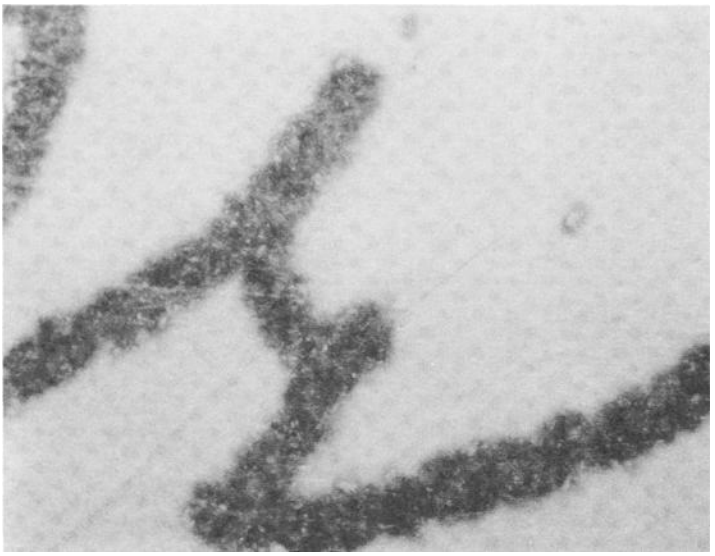

FIG. 11*b*—*(×20 magnification.) The features of the gelatin transfer signature are enhanced.*

FIG.12*a*—*Carbon traced signature (×10 magnification). The carbon particles are forcibly embedded in the fibers of the paper.*

Conclusion

Facsimile signatures produced by stamping devices are routinely and widely used as authorizing endorsements on all sorts of official documents. Therefore, the questioned document examiner can expect to come in contact with forged facsimile signatures which have been prepared in a variety of ways. The gelatin transfer duplicator is merely one process that can be used effectively in producing forged facsimile signatures. However, forged signatures prepared in this manner can be detected and identified.

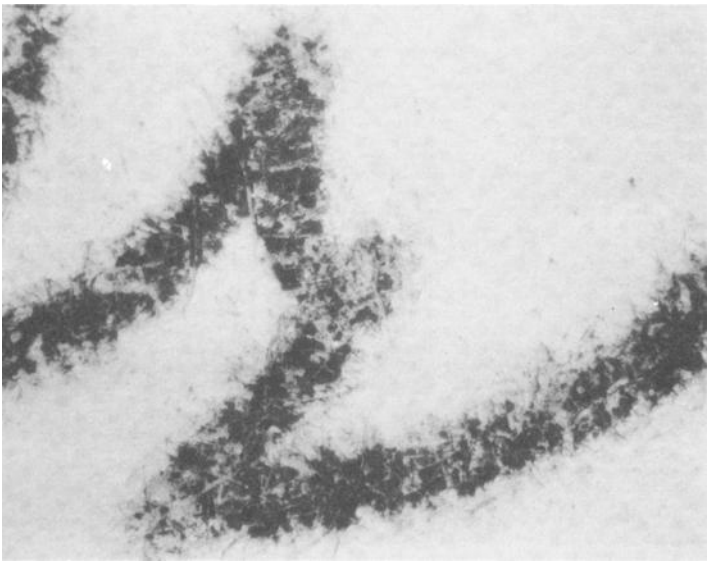

FIG. 12*b*—*(×20 magnification.) The features of the carbon traced signature are enhanced.*

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