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## Checkwriter Identification—Individuality

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**REFERENCE:** Vastrick, T. W. and Smith, E. J., “Checkwriter Identification—Individuality,” *Journal of Forensic Sciences*, JFSCA, Vol. 27, No. 1, Jan. 1982, pp. 161-168.

**ABSTRACT:** Checkwriters are established machines in the contemporary business world and, as such, are an established vehicle of criminal action. This paper offers practical suggestions for the identification of checkwriters through their impressions from information gained through original research.

**KEYWORDS:** questioned documents, printing equipment, checkwriters, business machines

Successful identification of a checkwriter impression requires repetitive and consistent commonality between questioned and known impressions of class and individual features, along with any idiosyncratic or very unusual features.

Feature articles on checkwriter identification [1,2], along with other texts, have dealt with gross, macroscopic individual and idiosyncratic features, such as chipped typeface and obvious misalignments, that are not always found in the regular course of business checkwriter impressions. The main purpose of the present writing is to supply practical information gained from original research of the subtle, microscopic individualities that make possible a higher percentage of true forensic checkwriter identifications.

### Procedure

Repetitive specimens of the amounts “\$1,234.50” and “\$6,789.00” were made on check stock from each of hundreds of checkwriters presently in use at various business establishments. These samples were microscopically examined to seek out and identify irregularities that were repeatedly and consistently found in the same locations of the repetitive specimens.

The question is then asked, “If one of these ten specimens from a single checkwriter was a questioned impression, could it be associated with the remaining nine specimens based solely on the characteristics found within the impression?”

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## Results

### *Macroscopic Examination*

Most checkwriter impressions use individual prefixes. These prefixes are either unique or made in an extremely limited quantity. Determination of the exact number of a particular individual prefix manufactured can be made through contact with the company that ordered the prefix or the manufacturer. It is not infrequent that an individual prefix is unique. Some prefixes contain a number rather than or along with a company name or symbol. Generally this is a registered number that is assigned by a checkwriter manufacturer to the business establishment. Information regarding the owner of such a number can be obtained from the manufacturer.

Some prefixes contain a one- or two-digit number along with a company name or symbol. Generally this number identifies a specific checkwriter from those checkwriters used by the same company that have the same individual prefix design (Fig. 1).

A word of reservation must be given in regard to any macroscopic or microscopic individual features found within the confines of a prefix and their relationship to the possible identification of a checkwriter to a questioned impression. Although not the norm, prefixes can be removed from a checkwriter by someone with minimal mechanical ability and can even be switched with prefixes from other checkwriters produced by the same manufacturer.

Ribbon impressions of two or more colors, which is the norm with contemporary checkwriters, should show a distinct border between the colors. By design, these borders should be located between a numeral and part of the printing element ("AND," "DOLS," or "CTS") so that this border will not be visible. Frequently, however, a shift of the ribbon results in the color border consistently bisecting a numeral or letter at the same location throughout repetitive specimens.

Although not frequent, misalignment was noted in more than a few instances, as shown in Fig. 2. When the misalignment occurred in numerals throughout this test, it existed on all of the numerals that were forged to the guilty segment.

Noted in a surprisingly frequent number of checkwriter samples were impressions whose embossing and ink intensity varied horizontally or vertically (Fig. 3). This variation is due to the typeface failing to strike flush with the platen for a variety of reasons. Not only can this variation be seen on the face of the exhibit, but the reverse side often displays this intensity difference in a more obvious manner.

Burroughs Corp. strongly recommends, as policy, that purchasers of their checkwriters

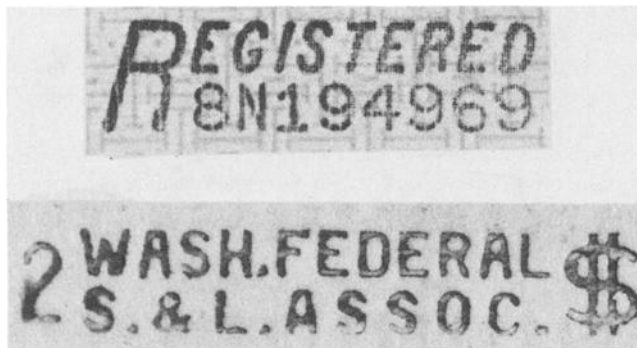


FIG. 1—Prefixes containing identification numbers. (Top) The size of the number indicates that it is the only checkwriter owned by a business or individual. (Bottom) The single digit number indicates that this specific checkwriter is one of many using this individual prefix.



FIG. 2—A horizontally and vertically misaligned numeral 7 from the amount "\$6,789.00." The numeral 2 in "\$1,234.50" from the same machine showed similar misalignment.



FIG. 3—The reverse side of a checkwriter impression showing extreme variation in ink intensity. The front side is shown in Fig. 8.

not order the optional payee perforator. None of the many Burroughs checkwriter impressions obtained had payee perforators. Discussion with representatives of Burroughs indicated that payee perforators on Burroughs models are extremely rare. In that respect, a payee perforator impression from a Burroughs checkwriter can be considered an idiosyncratic feature and, therefore, additive to the individuality of that impression.

#### *Microscopic Examination*

A number of microscopic individual features noted were related to class features of the checkwriter design and unique to that class. Therefore, microscopic individual features are discussed in relation to these various class features of checkwriters.

*Ribbon*—The impression made by a checkwriter ribbon contains areas of solid inking along with areas of dots or blemishes (Fig. 4). Some blemishes form a grid pattern, whereas others form narrowly horizontal or vertical lines. Still others appear random in their location. Examination revealed that most of these blemishes, which can be found within the boundaries of a typeface character, as well as between and around the characters, are indeed random as they are nonrepetitive and inconsistent. However, there were some blemishes in each impression that were consistently found in the same location of the ten repetitive specimens as demonstrated in Fig. 5.

Ribbon machines with the ridge-and-groove format should ideally create impressions with inked grooves and clear ridges. That, however, is rarely the case. Sometimes blemishes are predominant in the ridges, whereas at other times the ridges are solidly inked. On a number of occasions a series of solidly inked ridges and grooves was broken by a single ridge that was slightly inked (blemished).

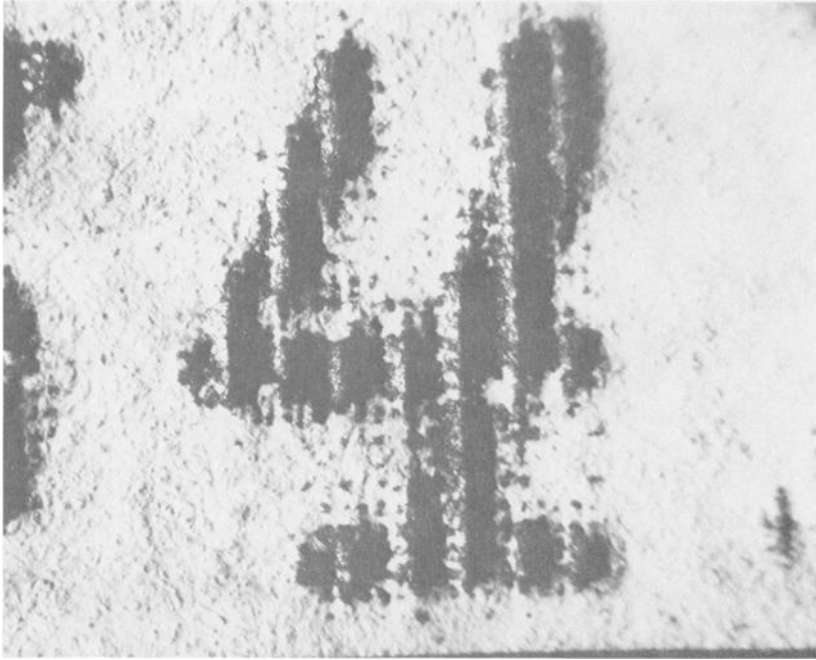


FIG. 4—Checkwriter impression of the numeral 4 showing blemishes. The blemishes are an identifying feature and a result of a ribbon used in the inking process.



FIG. 5—A series of six blemishes was found to run vertically along the left side of this numeral 3. This feature was repeated consistently on this checkwriter. The numerous dots in two of the corners of this photograph are part of the safety paper design.

An extremely worn ribbon will create general individualities including illegibility of minutiae and filled-in loops, as shown in Fig. 6.

*Liquid Ink*—Although most inked grooves of a ridge-and-groove format are generally oblong in shape, deviations in the inking shape could be noted. Figure 7 shows a groove that is inked in a kidney shape. Others appear to be diffusion of the ink but were found to be consistent among the repetitive specimens.

Some subtle and other not-so-subtle variations in hue were found within particular typeface characters on several occasions. Most of these hue variations were repetitive in nature.

A poor inking system can create some very idiosyncratic patterns, as shown in Fig. 8.

Not only are these gross, obvious individual features excellent for pragmatic purposes, but the affected regions are still susceptible to the microscopic individualities found on that class of checkwriter.

*Perforation Format and Payee Perforators*—The perforation format, at present, is domestically unique to F & E Hedman [1]. Generally, the individual features found in these checkwriter impressions were those listed under liquid ink machines. The major exception to this rule is the “perforation fingerprint” or the pattern of complete perforations versus those that do not entirely perforate the paper, as seen in Fig. 9. This feature was found to be surpris-



FIG. 6—The prevalent ribbon pattern has caused this prefix to be practically illegible.

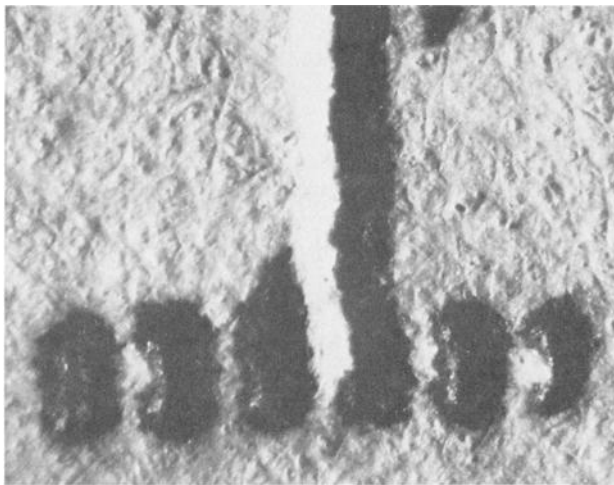


FIG. 7—The extreme right groove has been inked in a kidney shape. The general shape is common on many checkwriters. The specific shape, such as the angle of the arc, is individualistic.



FIG. 8—The poor inking of this checkwriter caused ink diffusion and smearing. More specific idiosyncracies can also be noted, such as the variation in ink intensity in the numerals 2 and 3.

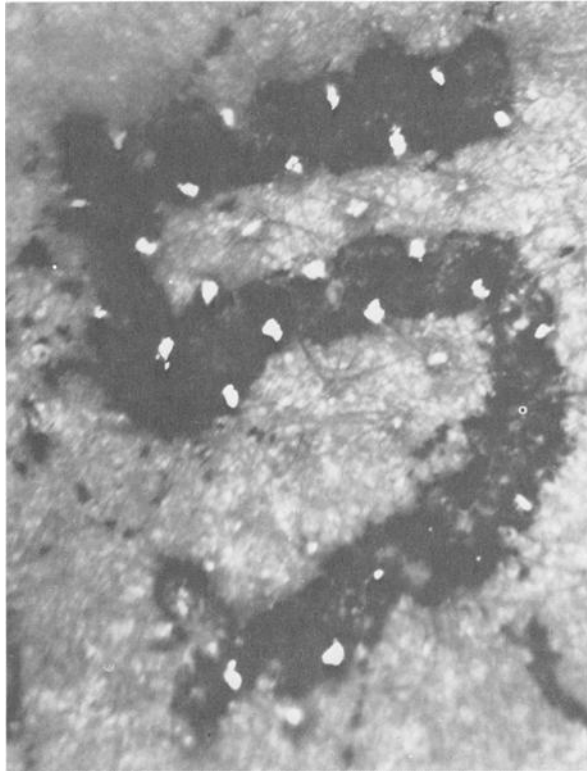


FIG. 9—A "perforation fingerprint" on a checkwriter utilizing a perforation format.

ingly repetitive. Examination and subsequent photographing are best performed with transmitted light. Examination from the reverse side of the impression has also proved helpful.

*Ridge-and-Groove Format*—Most prevalent with regard to individual features attributable to the ridge-and-groove format is the variation in the degree of embossing. This feature is best noted by microscopic examination of the reverse side of the check. The inked impression on the face of the check will show inking in areas of little or no embossing, although they are congruent with the established ridge-and-groove pattern. Figure 10 shows this feature at the base of the numeral 4. The ridge and groove format also displays a perforation fingerprint on many occasions.

*All Classes*—Although predominant in inking machines, small regions of ink voids could be found in every class of checkwriter. The mechanical causes of such voids are numerous, but the determination of consistency at the same locations throughout the repetitive specimens established the voids as individual features of specific checkwriters. Figure 4 contains a numeral with such voids.



FIG. 10—The small inked vertical bar at the base of the numeral 4 on a checkwriter utilizing a ridge-and-groove format showed little embossing effect. This feature was noticed on a number of machines.

### Conclusions

The question was asked with regard to each set of repetitive specimens, “If one of these ten specimens was a questioned impression, could it be associated with the remaining nine specimens based solely on the characteristics found within the impression?” The answer to this question is an unequivocal “Yes!”—even though, at cursory examination, it appeared that little if anything could be found that would be individualistic in most of the sample impressions. Microscopic examination revealed sufficient individualistic features within the class of checkwriter used to form a definite association, some to the point of identification, between any one impression of a set and the remaining nine “known” specimens in all of the test specimens examined.

This test manifested the importance of the following points with regard to examining checkwriter impressions:

1. Known specimens must be repetitive and verbatim in nature so that each typeface character can be compared to the same known feature and a determination made as to whether anything that appears individual is consistently and repeatedly found in the same location, thereby establishing a habitual pattern that can be demonstrated.
2. For best results, the samples should be taken on the same or similar stock as that used for the questioned checkwriter impression.
3. The known samples should be taken immediately so that as little time as possible separates the time that the questioned and known impressions were made. The closer the time frame, the better the chance of reproduction of the individual features present on the questioned impression.
4. Many features noted under the microscope as possibly being individual characteristics turned out to be class design features of that make of checkwriter. These features were very subtle. Familiarity with these features came only after much repetition in examination.

Although this test was based solely on the checkwriter impression, acquisition of any suspect checkwriters is of paramount importance to a thorough examination, as the known specimens will then be limitless and the mechanical cause of an individual feature can be determined and demonstrated, if needed.

### References

- [1] Vastrick, T. W., "Checkwriter Identification," presented at the American Society of Questioned Document Examiners Meeting in Rochester, NY, 1979; available from the author.
- [2] Purtell, D. J., "The Identification of Checkwriters," *Journal of Criminal Law, Criminology and Police Science*, Vol. 45, No. 2, July-Aug. 1954, pp. 229-235.

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