
FINGERPRINT COMPARISON



***Criminal Justice Information Services Division
Identification and Investigative Services Section***

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FINGERPRINT IDENTIFICATION

1. What are fingerprints?

An inked impression of the friction ridges located on the surface of the finger.

2. What is the purpose of fingerprint identification?

To establish the identity or non-identity of two sets of inked fingerprints.

3. What are fingerprint characteristics?

Characteristics are distinguishing attributes or elements used in fingerprints to make an identification. These are also known as ridge detail, points of identification, ridge characteristics or identifying characteristics.

- A. Ending Ridges
- B. Bifurcations
- C. Dots
- D. Enclosures
- E. Short Ridges

4. How are fingerprints compared?
 - A. Fingerprints are compared by noting the ridge characteristics in two prints to determine whether or not they match.
 - B. An identification is established when a number of these characteristics occupy the same relative position in the two prints.

5. How many points of identification (characteristics) are sufficient to establish an identification?
 - A. No standard number required.
 - B. Left to each individual fingerprint examiner.
 - C. Deciding factors:
 - 1.) Clarity of impressions.
 - 2.) Uniqueness of formations.
 - 3.) Fingerprint examiners experience and ability.

NOTE

As many as 150 ridge characteristics can be noted in the average fingerprint.

6. Be extremely cautious!

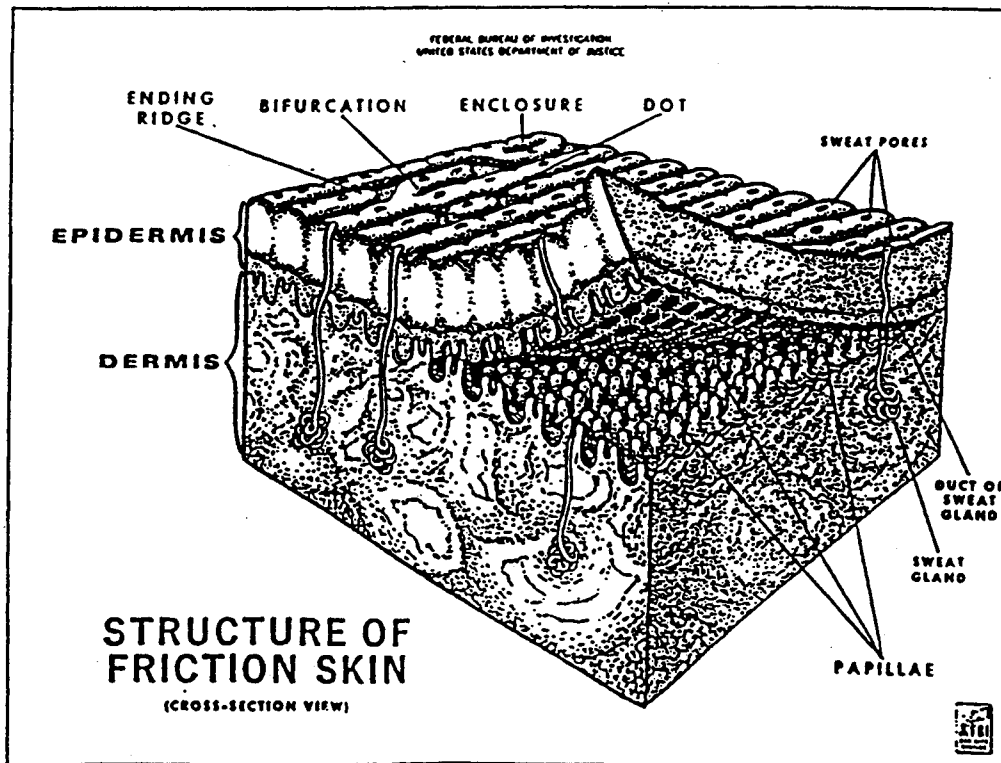
The integrity of the identification process depends on the fingerprint examiner devoting their full time and attention to their comparison work at all times.

A. Always be certain that the fingerprints have been printed in the proper finger blocks.

B. Be absolutely certain of your decision.

FRICITION RIDGES AND FINGERPRINT IDENTIFICATION

The epidermis consists of two main layers, namely the stratum corneum, which covers the surface, and the stratum mucosum, which is just beneath the covering surface. The stratum mucosum is folded under the surface so as to form ridges which will run lengthwise and correspond to the surface ridges. However, these are twice as numerous since the deeper ridges which correspond to the middle of the surface ridges alternate with smaller ones which correspond to the furrows. The sweat pores run in single rows along the ridges and communicate through the sweat ducts with the coil sweat glands which are below the entire epidermis. The friction ridges are formed prior to birth as a result of the fusion in rows of separate epidermic elements. Generally speaking, when an individual bruises or slightly cuts the outer layer or stratum corneum of the bulb of the finger, the ridges will not be permanently defaced. However, if a more serious injury is inflicted on the bulb of the finger, thereby damaging the stratum mucosum, the friction skin will heal, but not in its original formation. The serious injury will result in a permanent scar appearing on the bulb of the finger.



The presence of patterned ridges on the fingers and the palms was recognized by civilizations many centuries prior to the Christian era. A scientific approach to fingerprinting was essential before it could be put to practical use on any extensive scale. In 1883, Sir Francis Galton devised the first scientific method of classifying fingerprint patterns. In 1901, Sir Edward Richard Henry simplified fingerprint classification and made it applicable to police identification. It is the basic Henry system, with modifications and extensions, which is used by the FBI and throughout the United States.

Fingerprints offer an infallible means of personal identification. That is the essential explanation for their having supplanted other methods of establishing the identities of criminals reluctant to admit previous arrests. Other personal characteristics may change, but fingerprints are formed prior to birth and remain constant until death and decomposition.

Individuals may have the same pattern types, however, the ridge detail of every fingerprint of every person is different. This is also true of the palms of the hands and the toes and soles of the feet.

An inked fingerprint is a reproduction of the finger in black fingerprint ink on a white card. Comparisons are made by comparing the ridge characteristics in the two prints to determine whether or not the prints match. Identifications are made by noting ridge detail of similar shapes occupying the same relative position in the two prints.

A potential match must be analyzed and the various points of identification compared to establish the identity or non-identity of the two fingerprint impressions.

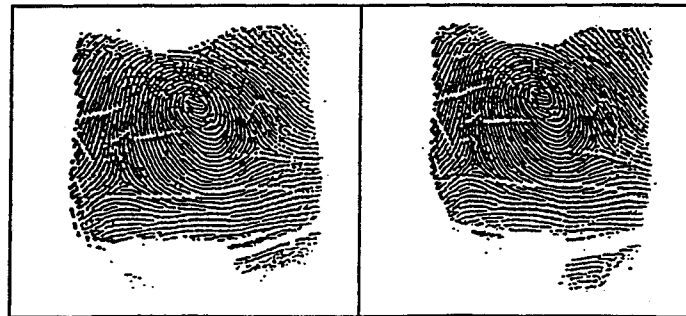
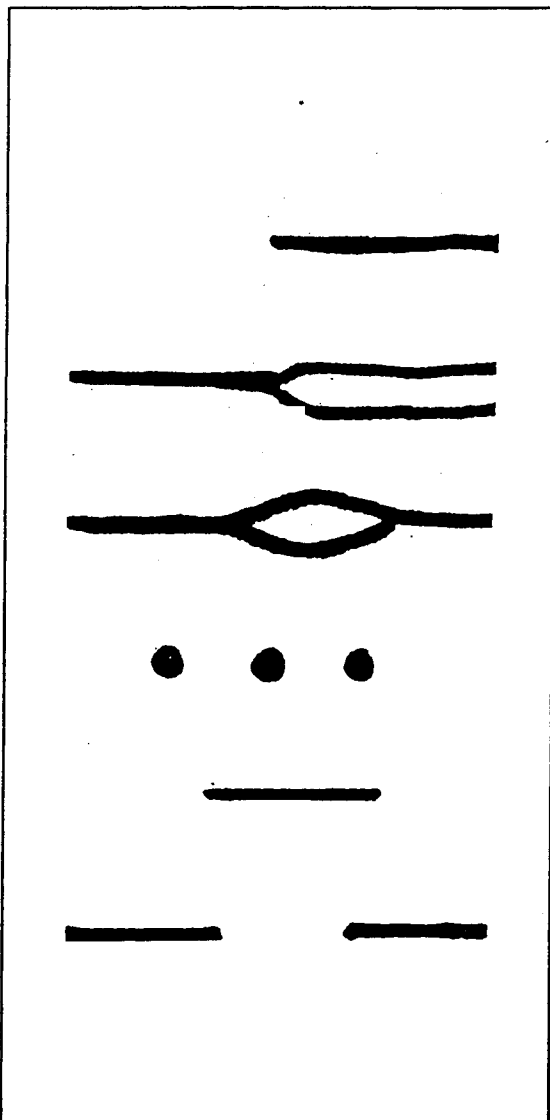


Image #1

Image #2

THE NATURE OF FRICTION SKIN

Below are examples of identification points or characteristics which may be used to compare fingerprint impressions.



.....Ending Ridge

.....Bifurcation or Fork

.....Enclosure (Island)

.....Dots

.....Short Ridge

.....Ridge Break

RIDGE CHARACTERISTICS



Common



Ending Ridge



Bifurcation



Dot

Occasional



Enclosure



"T" Junction



Short Ridge

Rare



Trifurcation

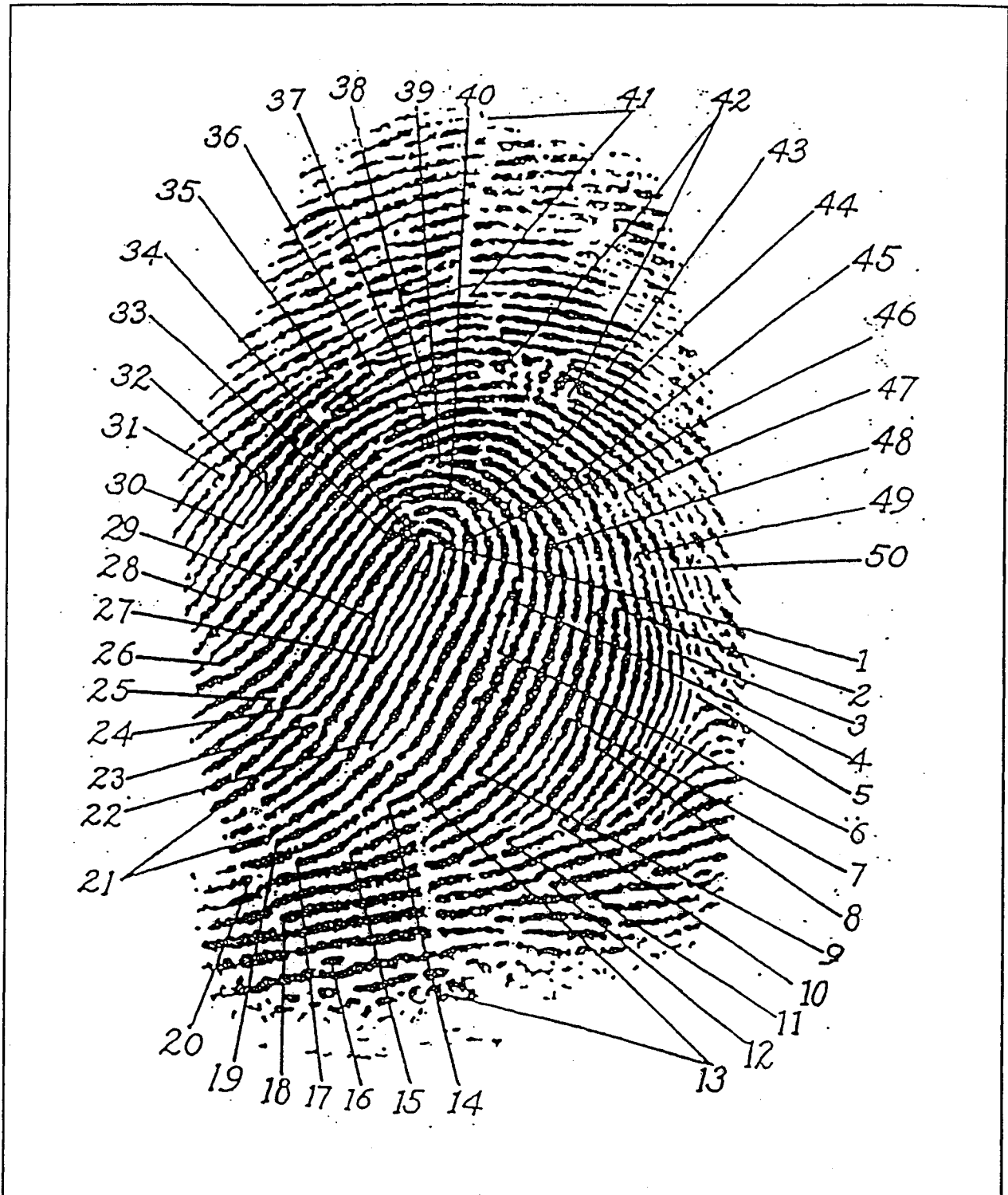


Ridge Crossing

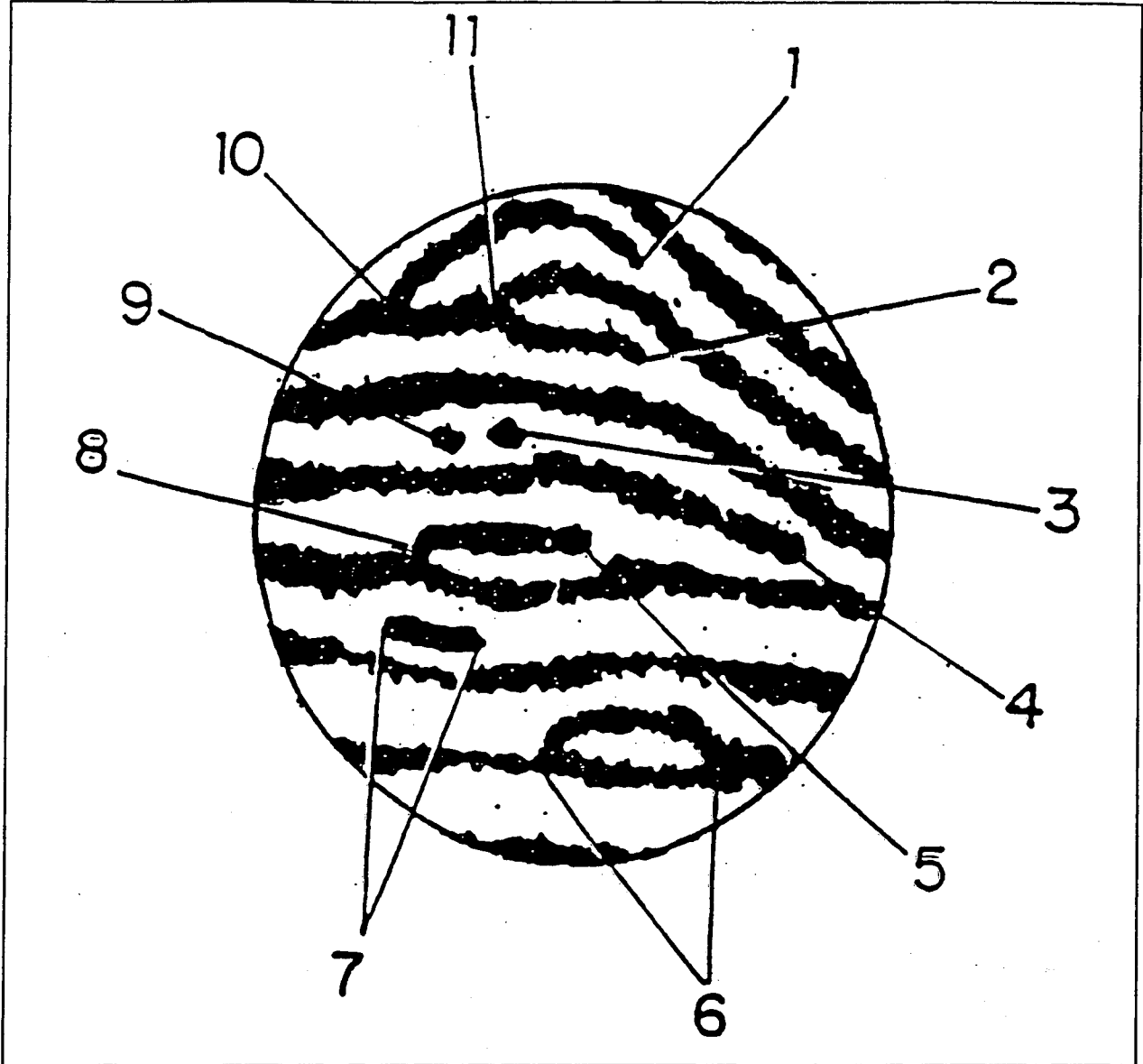


Row of Dots

**THE AVERAGE FINGERPRINT HAS AS MANY
AS 150 RIDGE CHARACTERISTICS**



RIDGE CHARACTERISTICS MAGNIFIED



Points 1, 2, 4, 5 are Ending Ridges

Points 8, 10, 11 are Bifurcations

Point 7 is a Short Ridge

Points 3 and 9 are Dots

Point 6 is an Enclosure (Island)

HOW TO COMPARE FINGERPRINTS

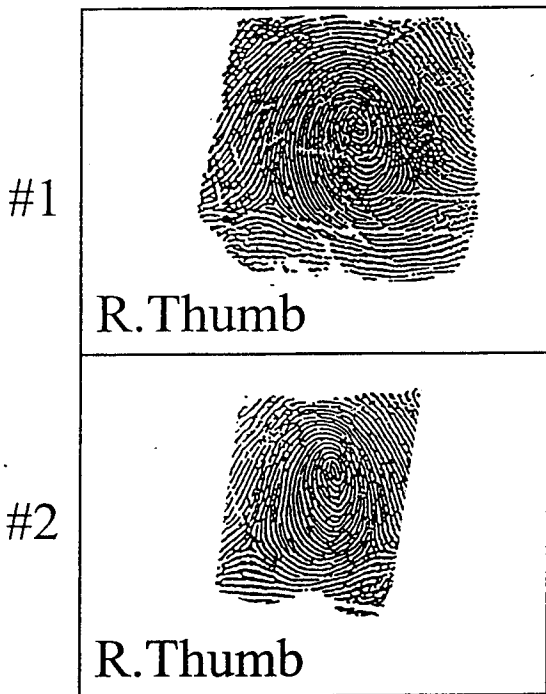
Fingerprints are compared by noting the ridge characteristics in two fingerprint impressions to determine whether or not they match. An identification is established when a number of these characteristics occupy the same relative position in the two fingerprint impressions.

When making a comparison the first observation would be, are the fingerprints of the same type (e.g., Arch, Loop, Whorl)? If the pattern types are the same, under a magnifier, examine the fingerprint characteristics, ending ridges, enclosures, short ridges, bifurcations, etc. Look for the most obvious point(s) of identification, this would be the characteristic(s) that captures your attention when first looking at the fingerprint impression. Compare this characteristic/point to the potential match. If the same characteristic/point is present in both prints, count the number of ridges from your first characteristic/point to the second characteristic, continue this process until you have determined that the two fingerprint impressions are the same.

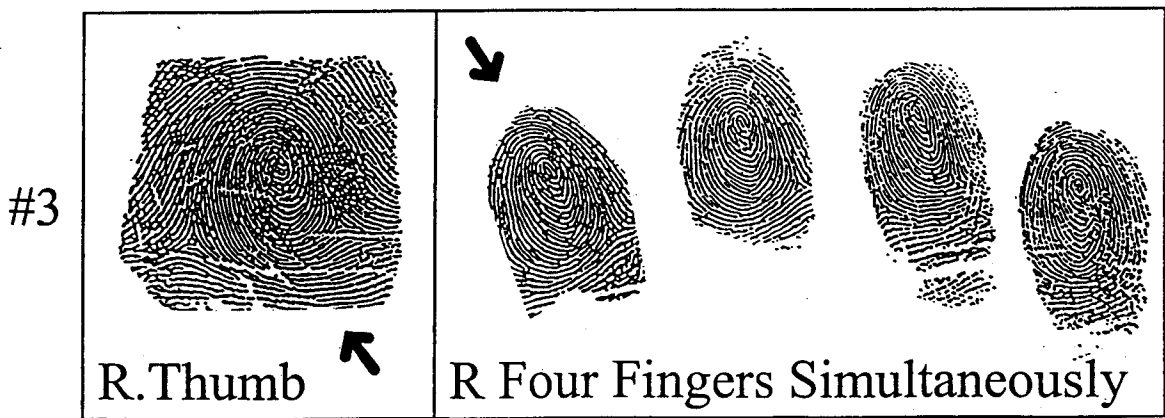
There is no standard number of characteristics required to establish an identification. The fingerprint examiner must determine when enough points have been located to make an identification. This number may vary due to clarity, uniqueness of formations, experience and ability.

If a fingerprint examiner determines that the two prints are non-identical, the sequential order must always be checked by using the plain impressions. This will eliminate the erroneous comparison of fingerprint impressions which were printed out of sequential order.

Comparing the two right thumb impressions, example #1 and example #2, the prints appear to be non-identical. However, when checking the sequential order with the plain impressions, example #3, it is apparent that the finger appearing in the right thumb block, example #2, is not the right thumb.

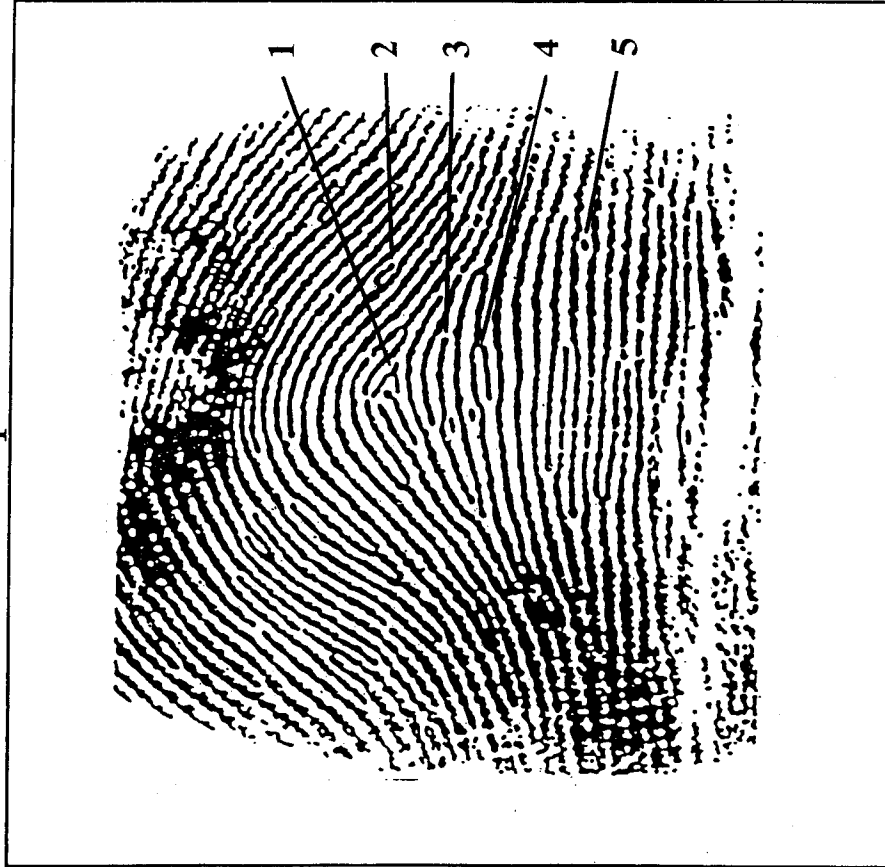


← Example #2:
Rolled the right index finger instead of the right thumb.

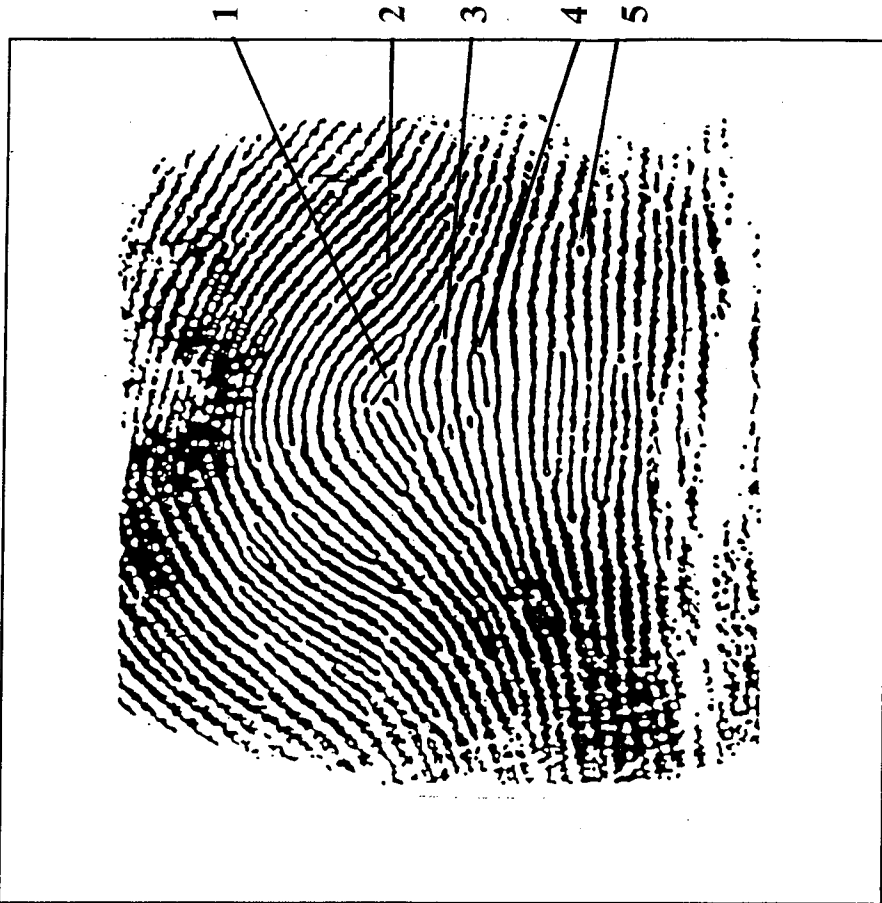


FINGERPRINT COMPARISONS

Example #1

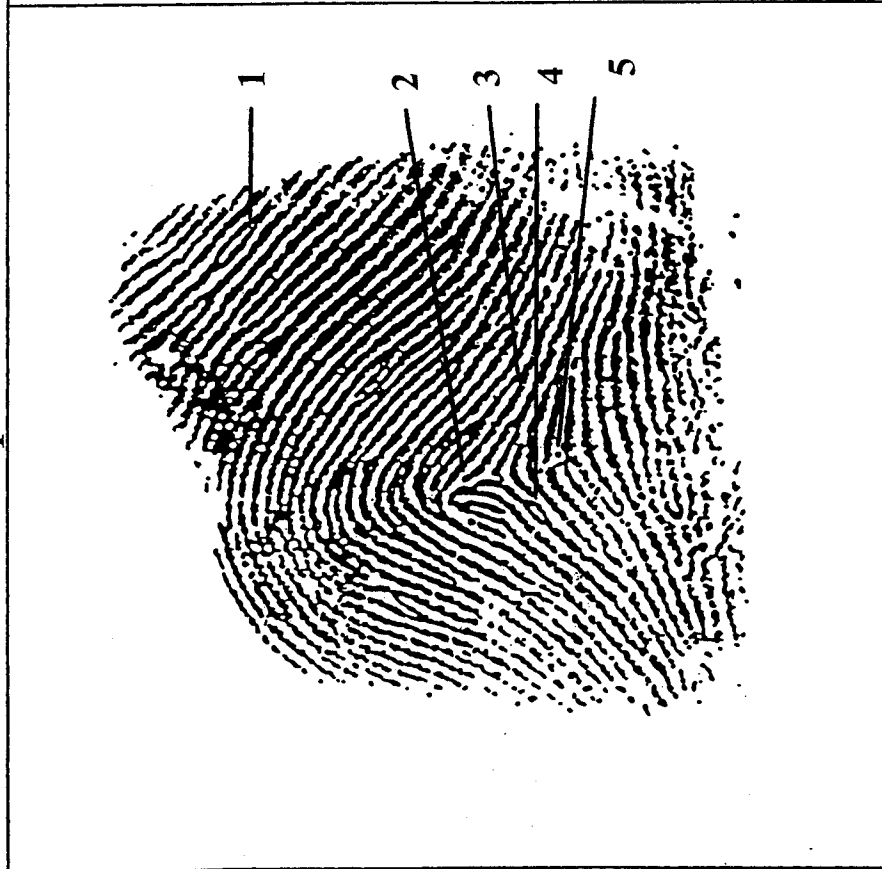


Example #2

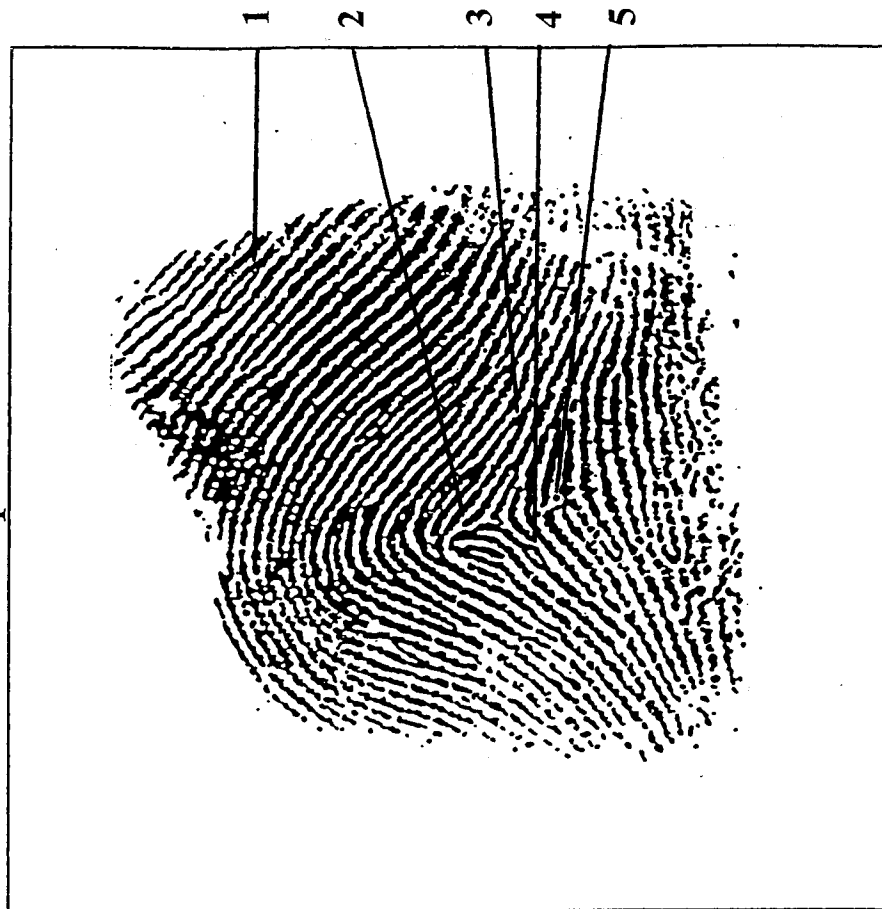


FINGERPRINT COMPARISONS

Example #3

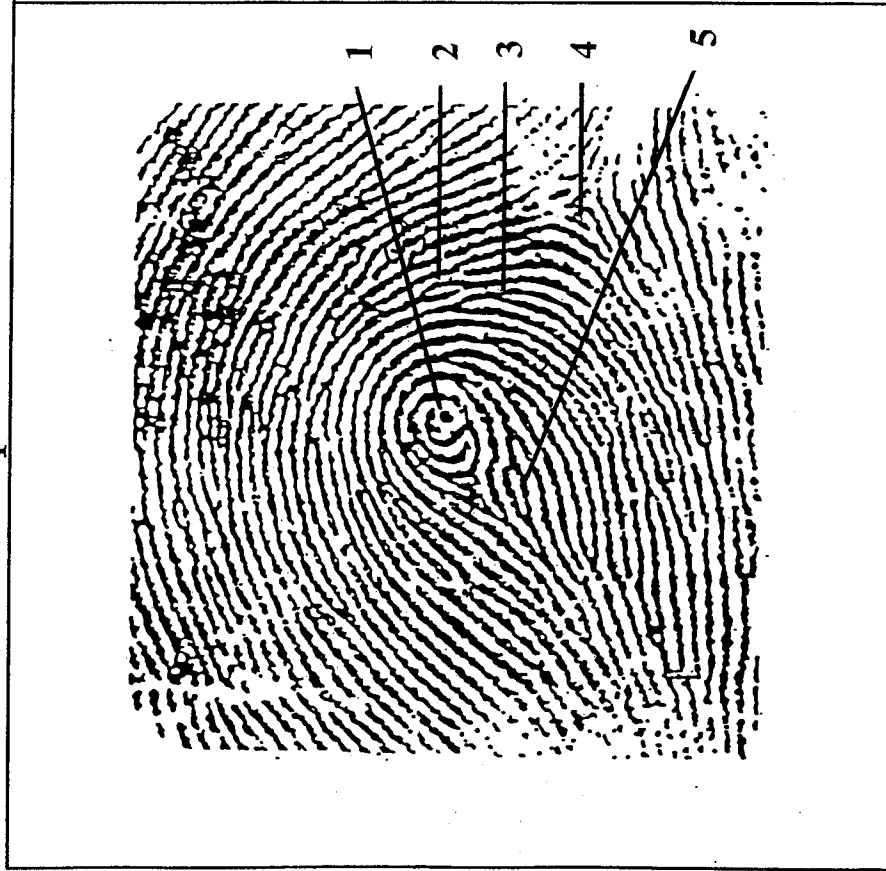


Example #4

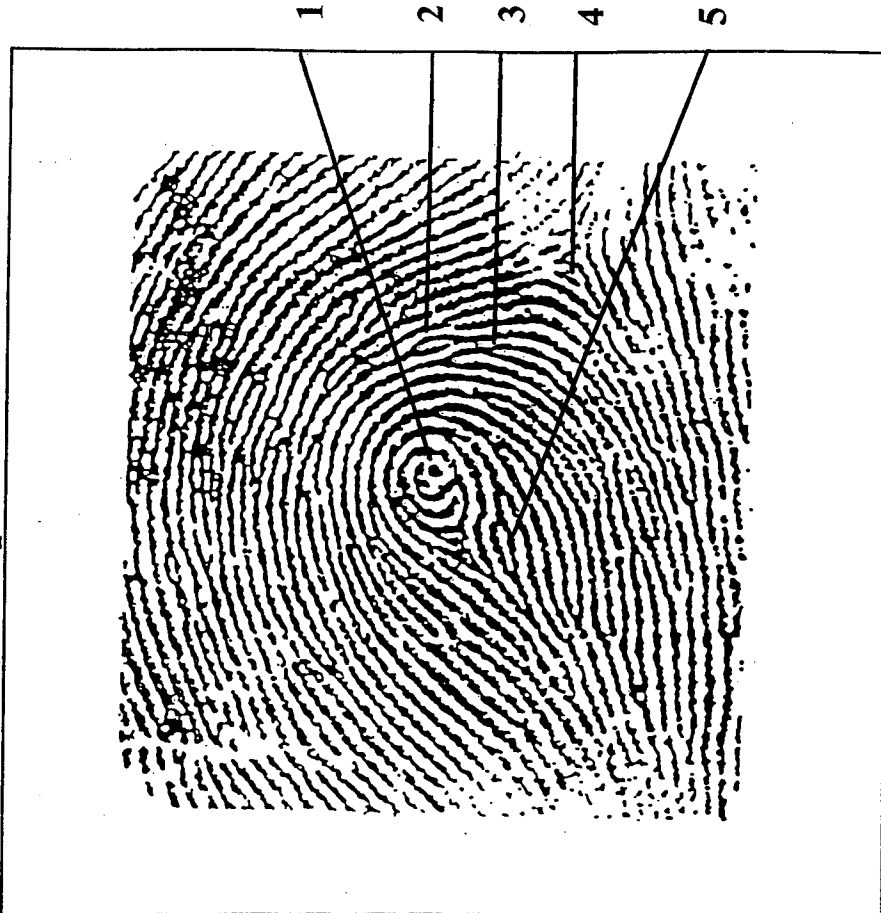


FINGERPRINT COMPARISONS

Example #5

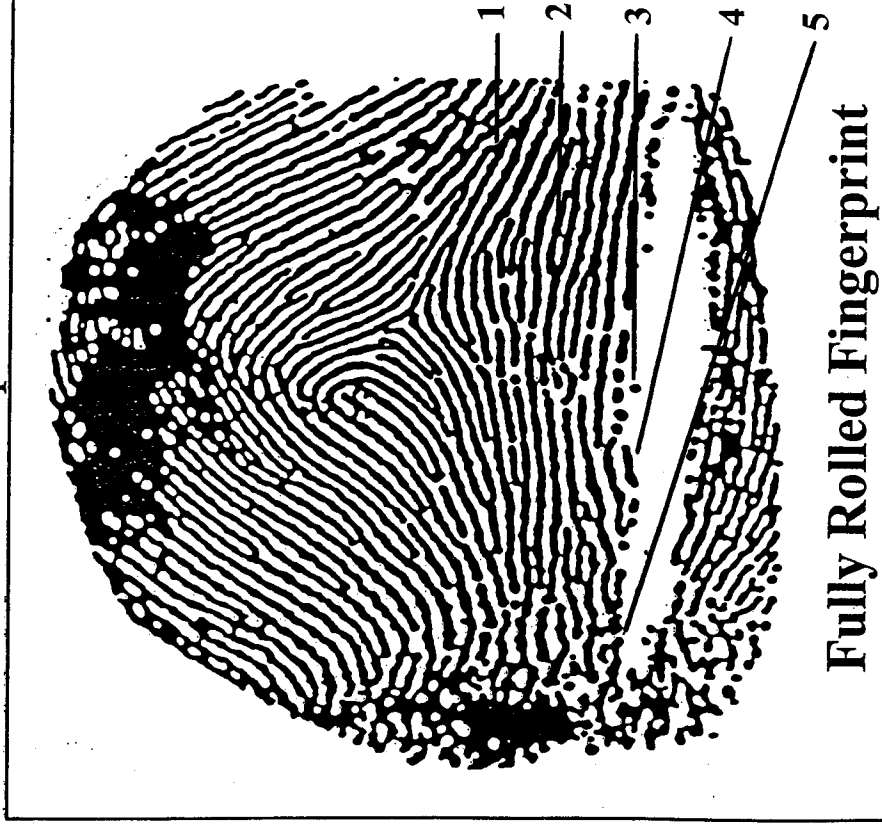


Example #6



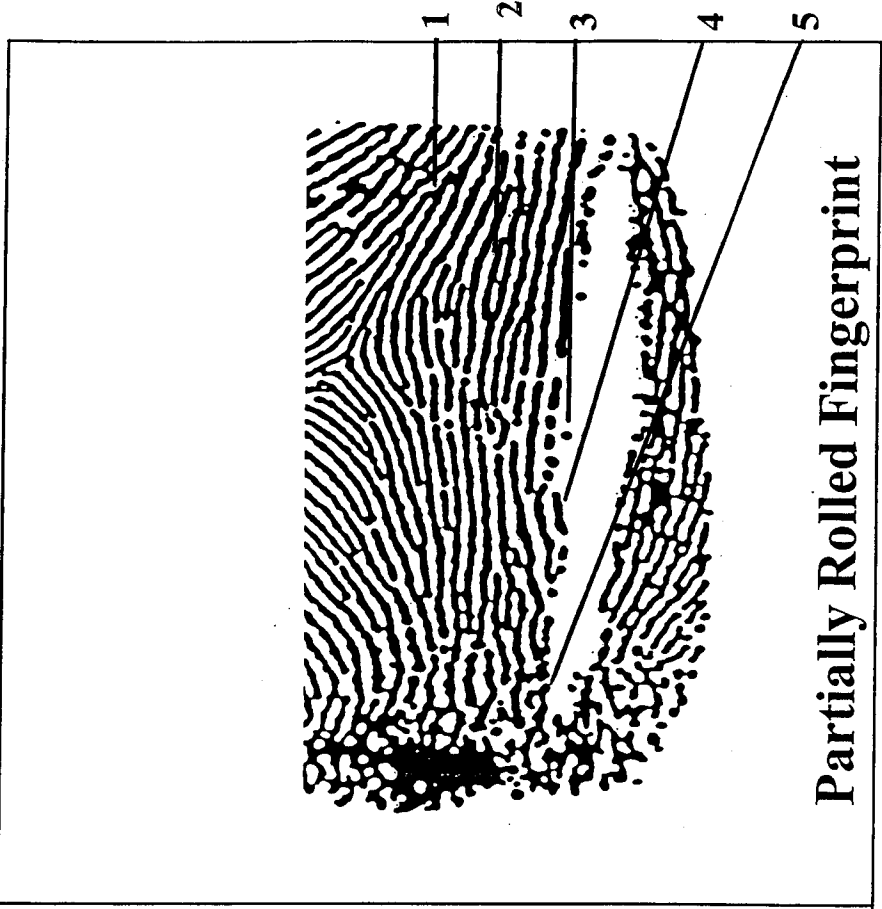
FINGERPRINT COMPARISONS

Example #7



Fully Rolled Fingerprint

Example #8



Partially Rolled Fingerprint

Note

When making comparisons, look at the amount of ink that was used in capturing the fingerprint impressions.

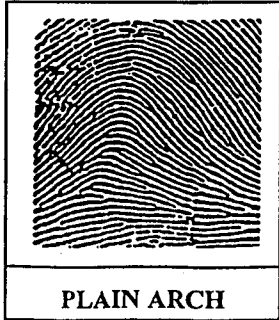
If the fingers were heavily inked, ending ridges may appear as bifurcations. Fingerprints are a series of ridges and valleys. Heavy inking will fill a valley and the ridges will not appear the same. If too little ink is

used, the opposite may happen, a bifurcation will appear as an ending ridge. In this case, the ridge was not coated with ink and the technician will fail to capture all of the ridge detail, therefore, the

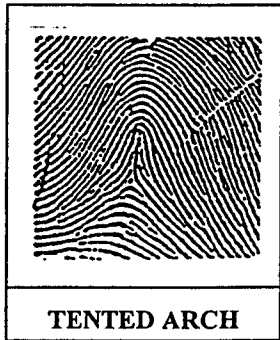
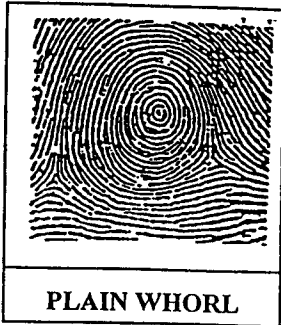
characteristic/point appears on paper as an ending ridge. A technician taking fingerprints can change the appearance of fingerprints by applying too much pressure when rolling the fingers from nail to nail.

Therefore, the plain impressions, which are taken simultaneously and are not subject to pressure, may give a true or better reading of how the ridges actually appear.

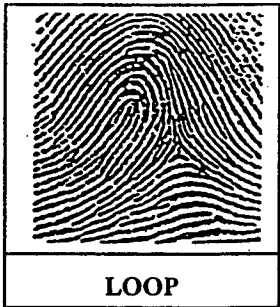
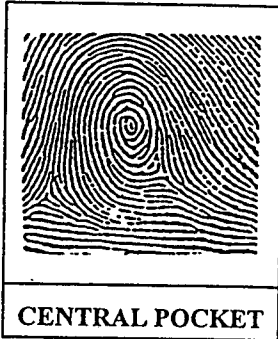
FEDERAL BUREAU OF INVESTIGATION
CRIMINAL JUSTICE INFORMATION SERVICES DIVISION



ILLUSTRATIONS
OF VARIOUS
FINGERPRINT
PATTERNS



THE
PRESENCE OR EXISTENCE
OF WHORLS IN FINGER IMPRESSIONS
IS USED AS THE BASIS FOR THE
DETERMINATION OF THE CHIEF OR
PRIMARY CLASSIFICATION.
EACH WHORL APPEARING IN ANY
OR ALL OF THE TEN FINGERS HAS A
CERTAIN ARBITRARY OR FIXED
VALUE. THE ADDITION OF THE
VALUES REPRESENTED BY SUCH
WHORLS AND THE INDICATION OF
THE TOTAL VALUE IS KNOWN AS
THE PRIMARY CLASSIFICATION.



ILLUSTRATIONS OF THE
WHORL TYPES WHICH ARE THE
SAME AS PATTERNS HAVING THE
FIGURED VALUE ARE SHOWN ON
THE RIGHT OF THIS CHART;
ILLUSTRATIONS OF THE OTHER
TYPES ARE SHOWN ON THE LEFT.

