



United States Patent [19]

[11] Patent Number: **6,101,507**

Cane et al.

[45] Date of Patent: ***Aug. 8, 2000**

[54] FILE COMPARISON FOR DATA BACKUP AND FILE SYNCHRONIZATION

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[*] Notice: This patent issued on a continued prosecution application filed under 37 CFR 1.53(d), and is subject to the twenty year patent term provisions of 35 U.S.C. 154(a)(2).

[21] Appl. No.: **09/021,705**

[22] Filed: **Feb. 10, 1998**

Related U.S. Application Data

[60] Provisional application No. 60/037,597, Feb. 11, 1997.

[51] Int. Cl.⁷ **G06F 17/30**

[52] U.S. Cl. **707/204; 707/203; 707/201; 714/6; 711/162**

[58] Field of Search **707/203, 1, 204, 707/201, 207; 714/6; 711/162**

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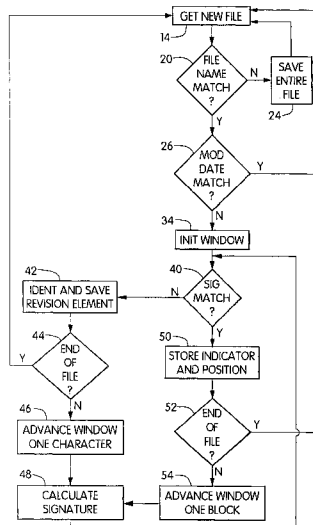
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[57] ABSTRACT

File comparison employs a single function F to calculate a digital signature from data in a sliding window. The digital signature is both incrementally computable and position sensitive. In particular, F is computable without reprocessing each byte in the array when the window is advanced and facilitates detection of such changes as transposed bytes of data. The function F is defined by two qualities. First, for F(A+B), where A is an array, F(A+B)=F(A)+F(B). Second, given a concatenation operator "!" such that "0!A" indicates an array A with 0 inserted before A, the function F has the property that there is a function G such that F(0!A)=G(F(A'0)). Both polynomials and cyclic redundancy checks ("CRC") may be used as that class of function.

17 Claims, 4 Drawing Sheets



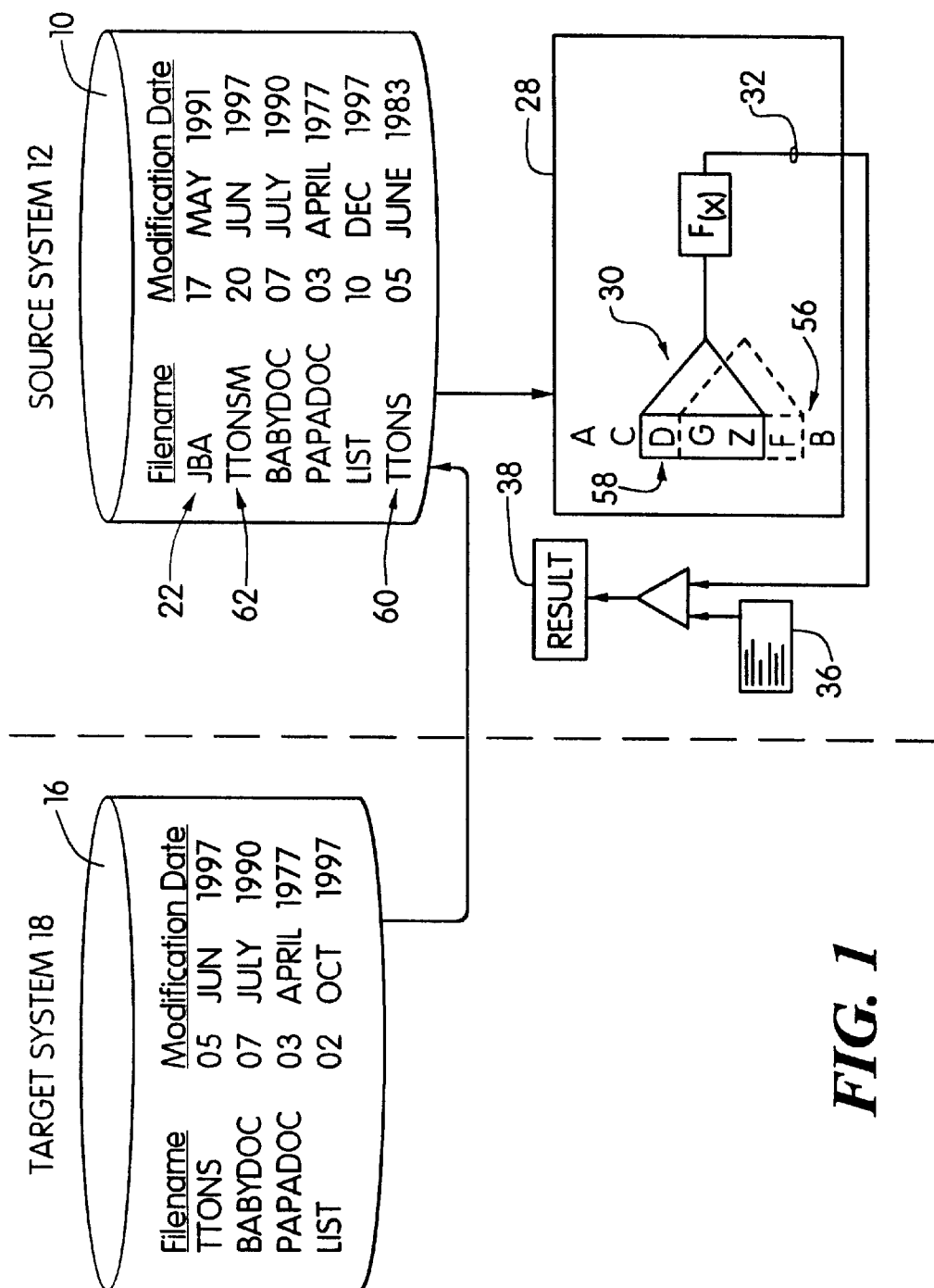


FIG. 1

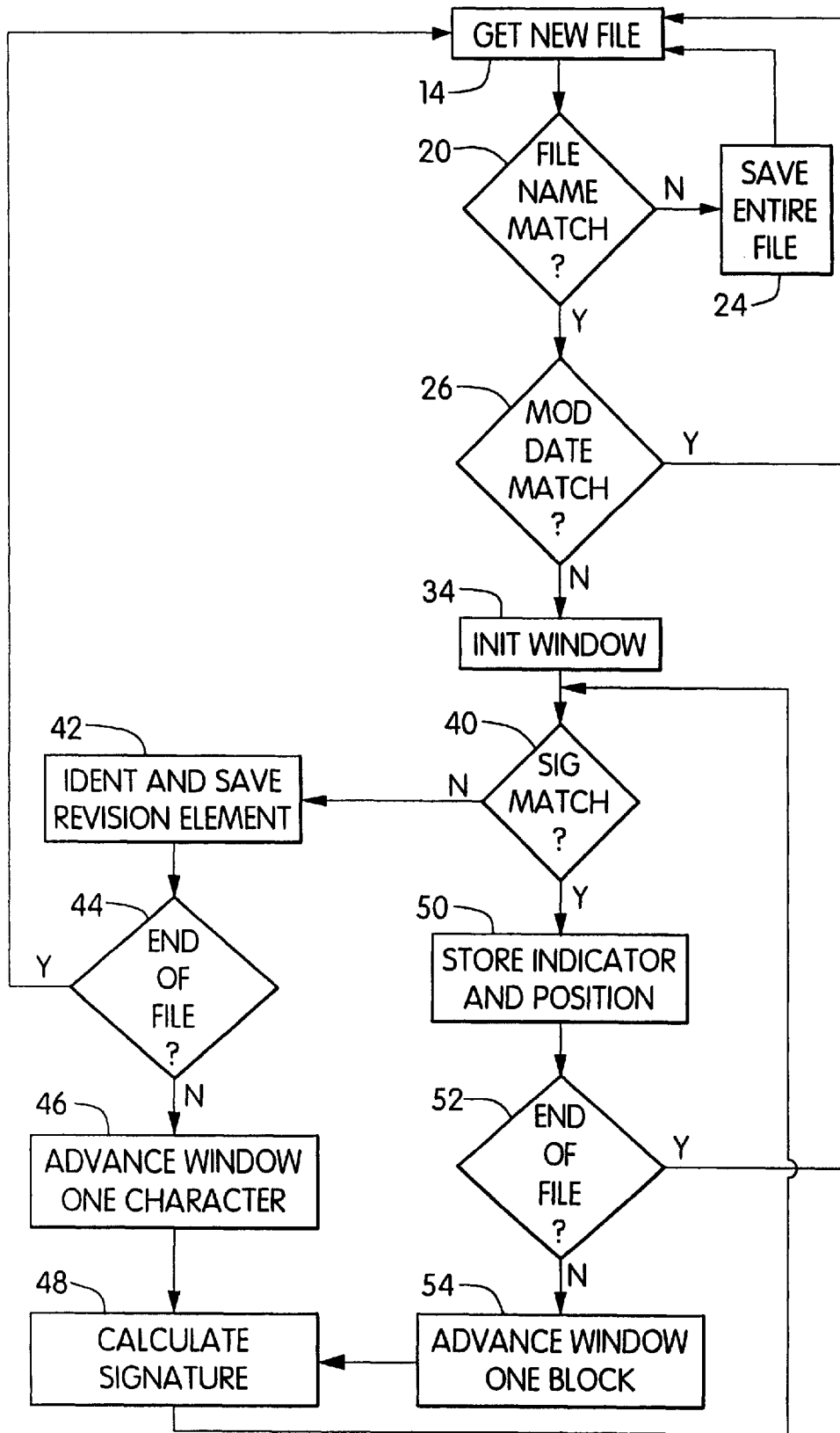


FIG. 2

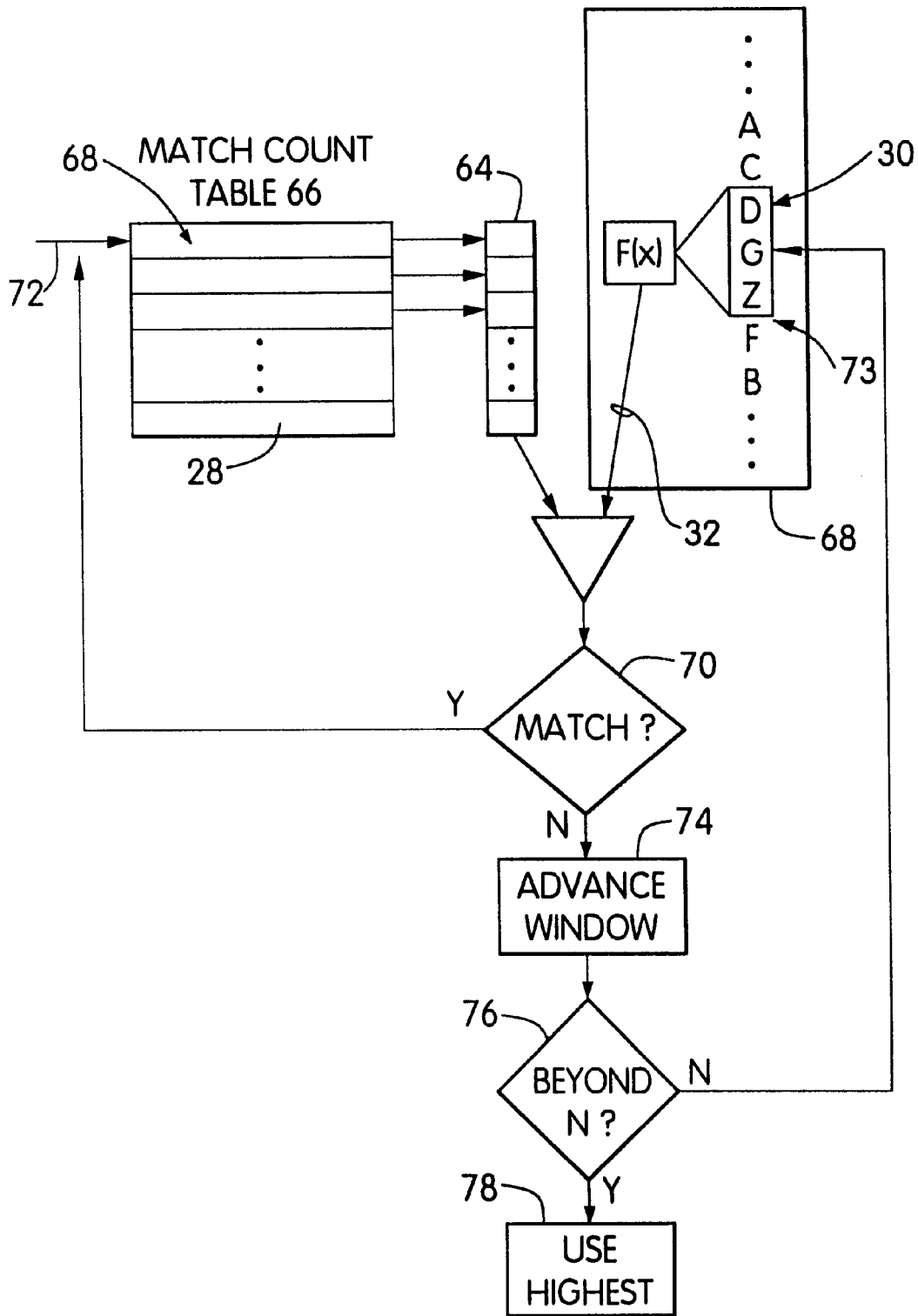


FIG. 3

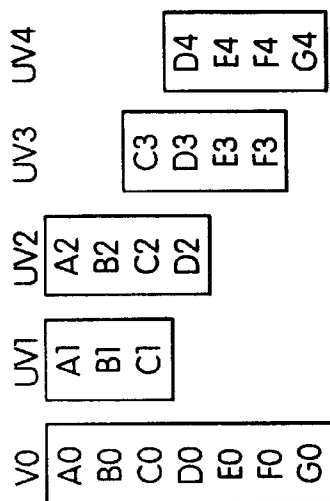


FIG. 4

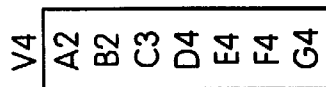


FIG. 5

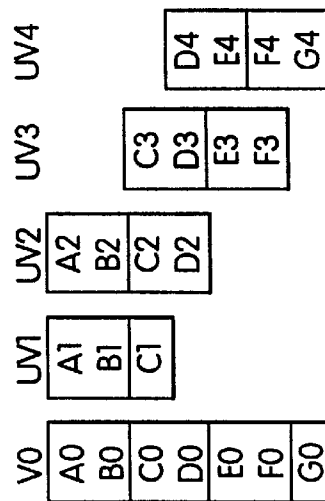


FIG. 6

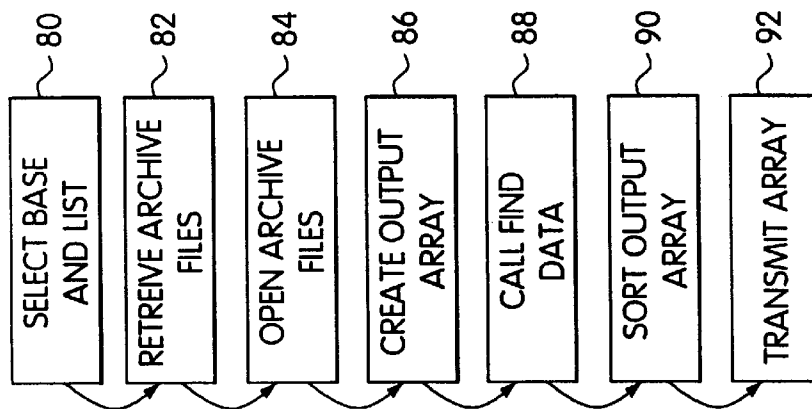


FIG. 7

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