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Arnold et al.

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[54] **AUTOMATIC IMMUNE SYSTEM FOR COMPUTERS AND COMPUTER NETWORKS**

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[51] **Int. Cl.**[6] **G06F 11/00**

[52] **U.S. Cl.** **395/181;** 395/700; 395/183.09; 395/183.14

[58] **Field of Search** 395/575; 371/16.5, 19, 371/11.2, 8.2

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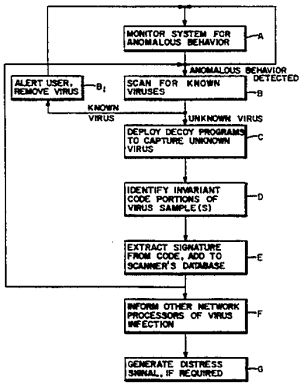
[57] **ABSTRACT**

A method includes the following component steps, or some functional subset of these steps: (A) periodic monitoring of a data processing system (**10**) for anomalous behavior that may indicate the presence of an undesirable software entity such as a computer virus, worm, or Trojan Horse; (B) automatic scanning for occurrences of known types of undesirable software entities and taking remedial action if they are discovered; (C) deploying decoy programs to capture samples of unknown types of computer viruses; (D) identifying machine code portions of the captured samples which are unlikely to vary from one instance of the virus to another; (E) extracting an identifying signature from the executable code portion and adding the signature to a signature database; (F) informing neighboring data processing systems on a network of an occurrence of the undesirable software entity; and (G) generating a distress signal, if appropriate, so as to call upon an expert to resolve difficult cases. A feature of this invention is the automatic execution of the foregoing steps in response to a detection of an undesired software entity, such as a virus or a worm, within a data processing system. The automatic extraction of the identifying signature, the addition of the signature to a signature data base, and the immediate use of the signature by a scanner provides protection from subsequent infections of the system, and also a network of systems, by the same or an altered form of the undesirable software entity.

46 Claims, 7 Drawing Sheets



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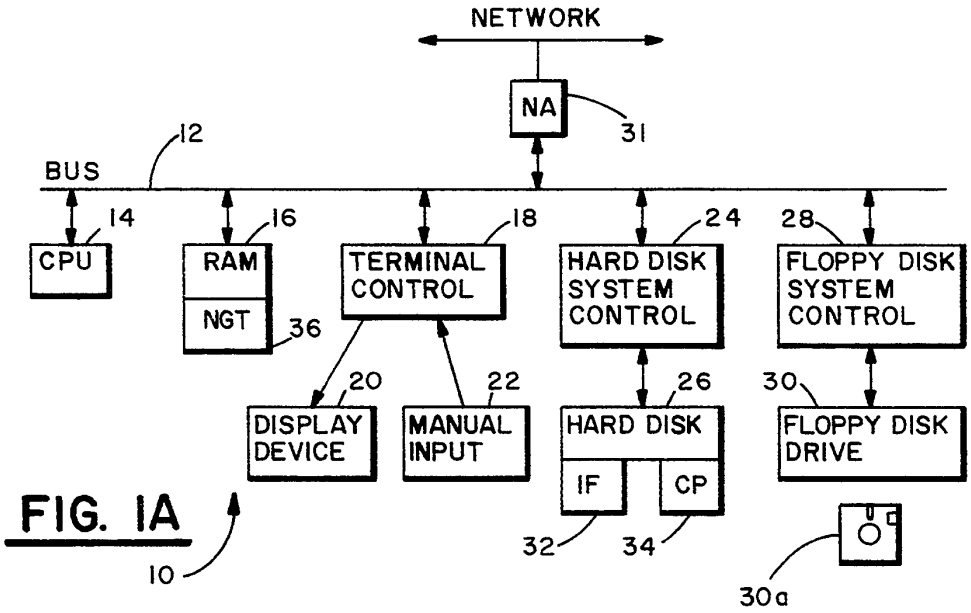

FIG. 1A

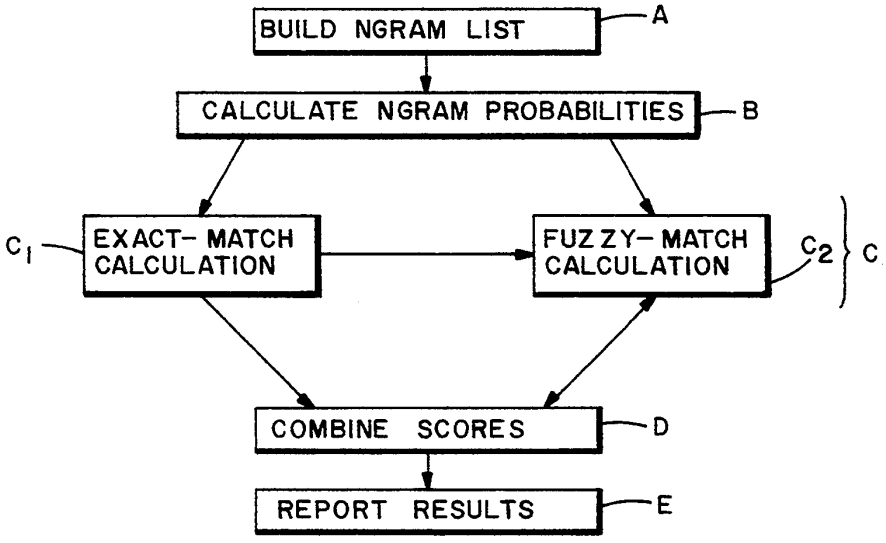

FIG. 5

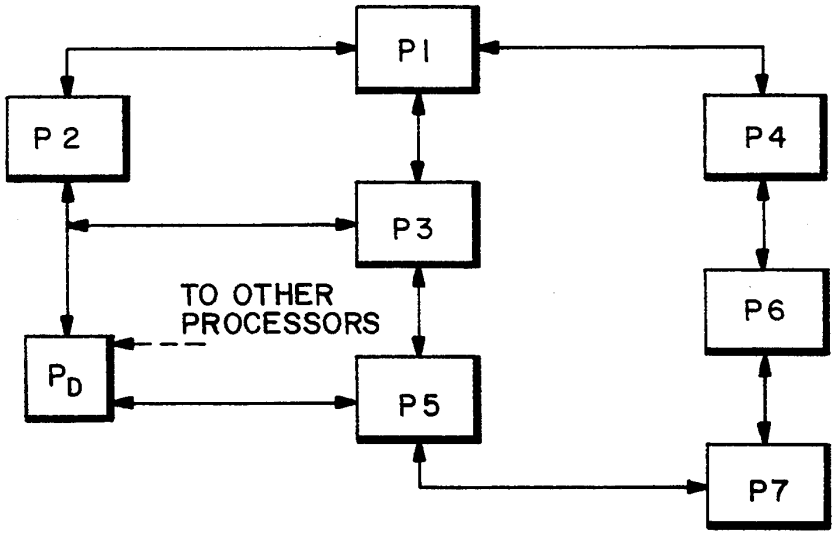

FIG. 1B

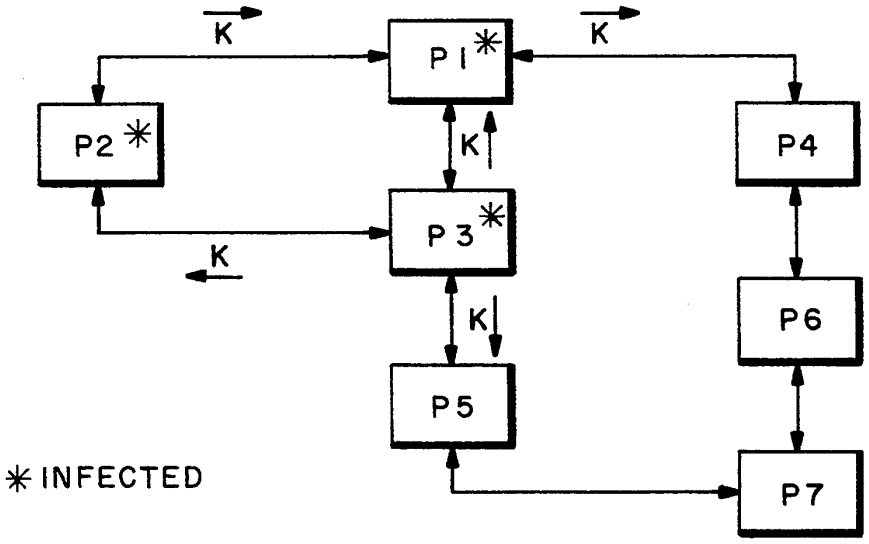

FIG. 1C

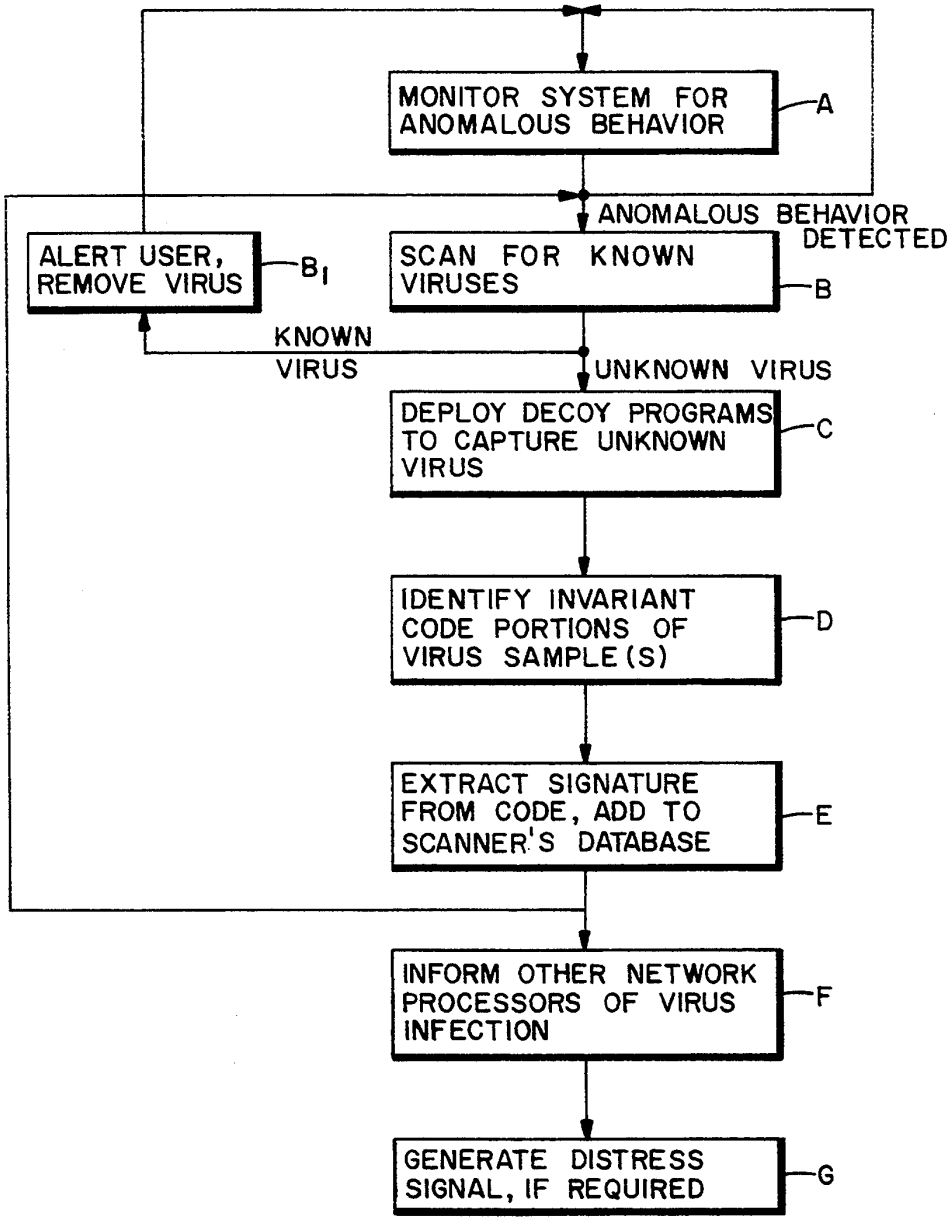

FIG. 2

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