United States Patent [19]

Wesinger, Jr. et al.

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[54] **FIREWALL PROVIDING ENHANCED NETWORK SECURITY AND USER TRANSPARENCY**

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[21] Appl. No.: **08/733,361**

[22] Filed: **Oct. 17, 1996**

[51] **Int. Cl.**^{6} **G06F 1/00**

[52] **U.S. Cl.** **395/187.01**; 395/200.55; 395/200.57

[58] **Field of Search** 395/186, 187.01, 395/188.01, 200.3, 200.55, 200.68, 200.57; 380/3, 4, 21, 23, 25; 340/825.3

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[57] **ABSTRACT**

The present invention, generally speaking, provides a firewall that achieves maximum network security and maximum user convenience. The firewall employs "envoys" that exhibit the security robustness of prior-art proxies and the transparency and ease-of-use of prior-art packet filters, combining the best of both worlds. No traffic can pass through the firewall unless the firewall has established an envoy for that traffic. Both connection-oriented (e.g., TCP) and connectionless (e.g., UDP-based) services may be handled using envoys. Establishment of an envoy may be subjected to a myriad of tests to "qualify" the user, the requested communication, or both. Therefore, a high level of security may be achieved. The usual added burden of prior-art proxy systems is avoided in such a way as to achieve fall transparency-the user can use standard applications and need not even know of the existence of the firewall. To achieve full transparency, the firewall is configured as two or more sets of virtual hosts. The firewall is, therefore, "multi-homed," each home being independently configurable. One set of hosts responds to addresses on a first network interface of the firewall. Another set of hosts responds to addresses on a second network interface of the firewall. In one aspect, programmable transparency is achieved by establishing DNS mappings between remote hosts to be accessed through one of the network interfaces and respective virtual hosts on that interface. In another aspect, automatic transparency may be achieved using code for dynamically mapping remote hosts to virtual hosts in accordance with a technique referred to herein as dynamic DNS, or DDNS.

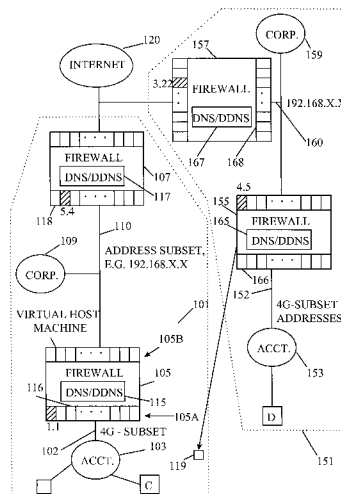**21 Claims, 9 Drawing Sheets**

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FIG. 1

INTERNET

220

FIREWALL

207

DNS/DDNS

217

209

CORP.
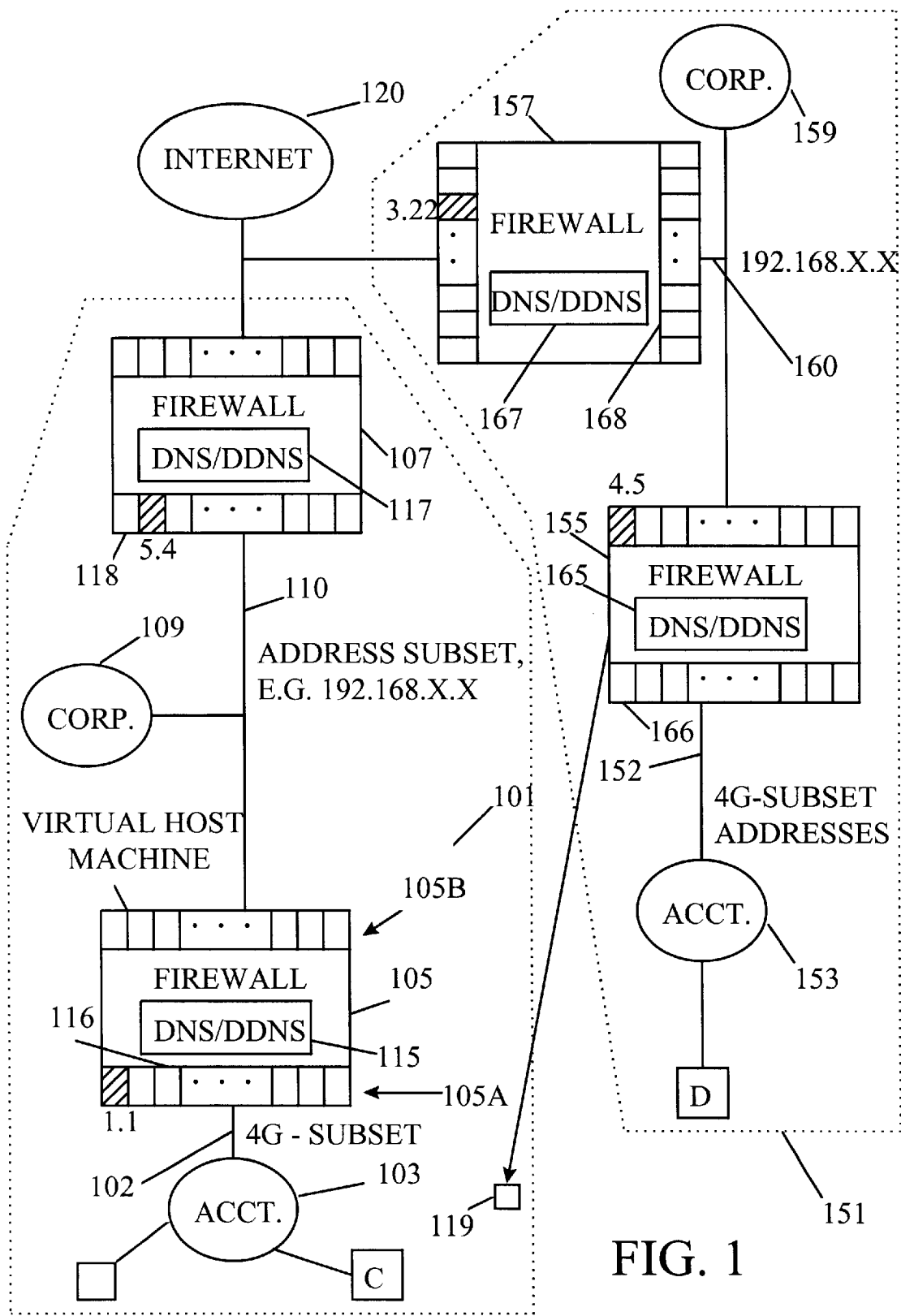
215

DNS/DDNS

205

202

203

ENG.

ACCT.

FIG. 2

FIG. 3

DOCKET ALARM
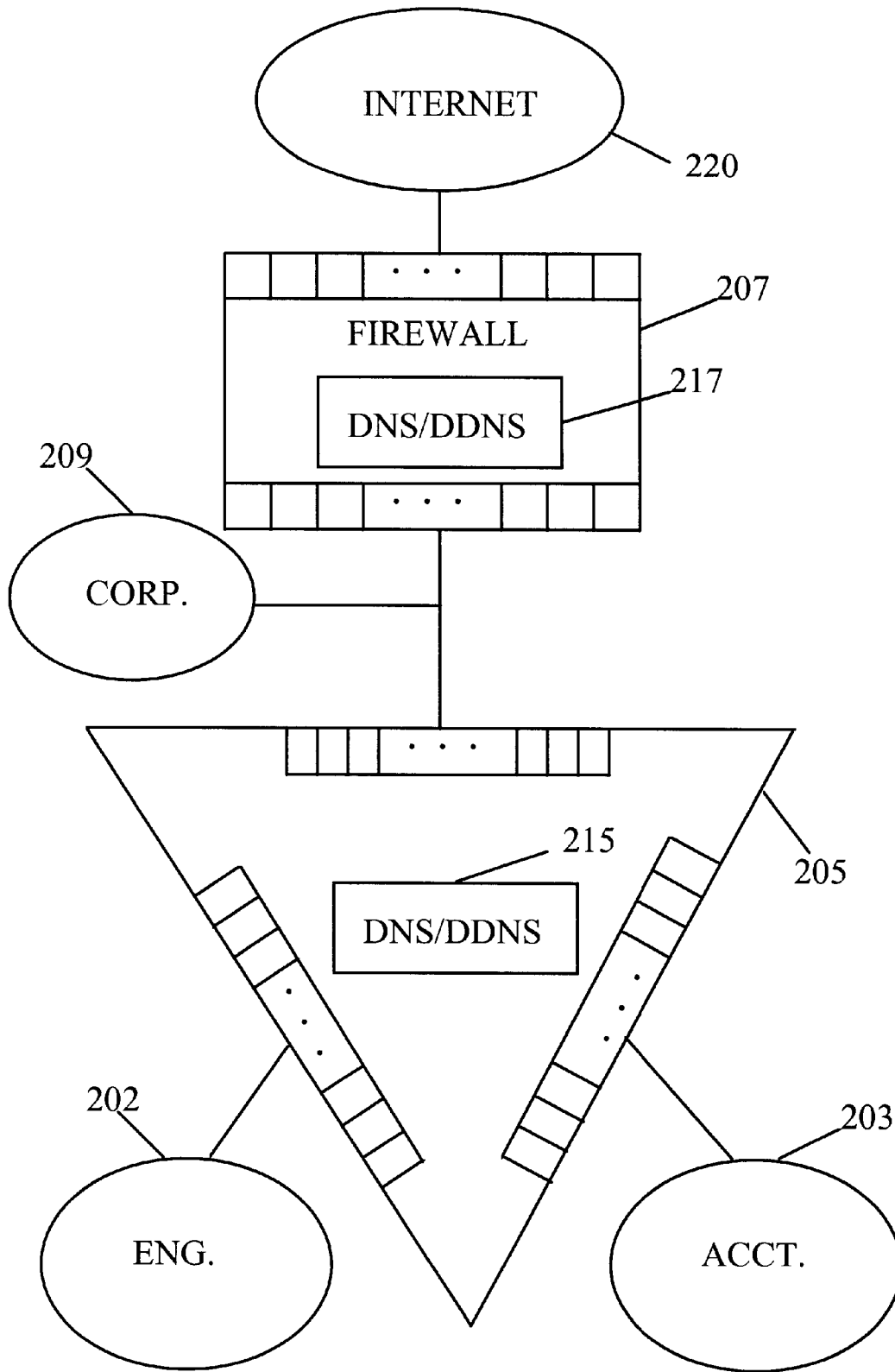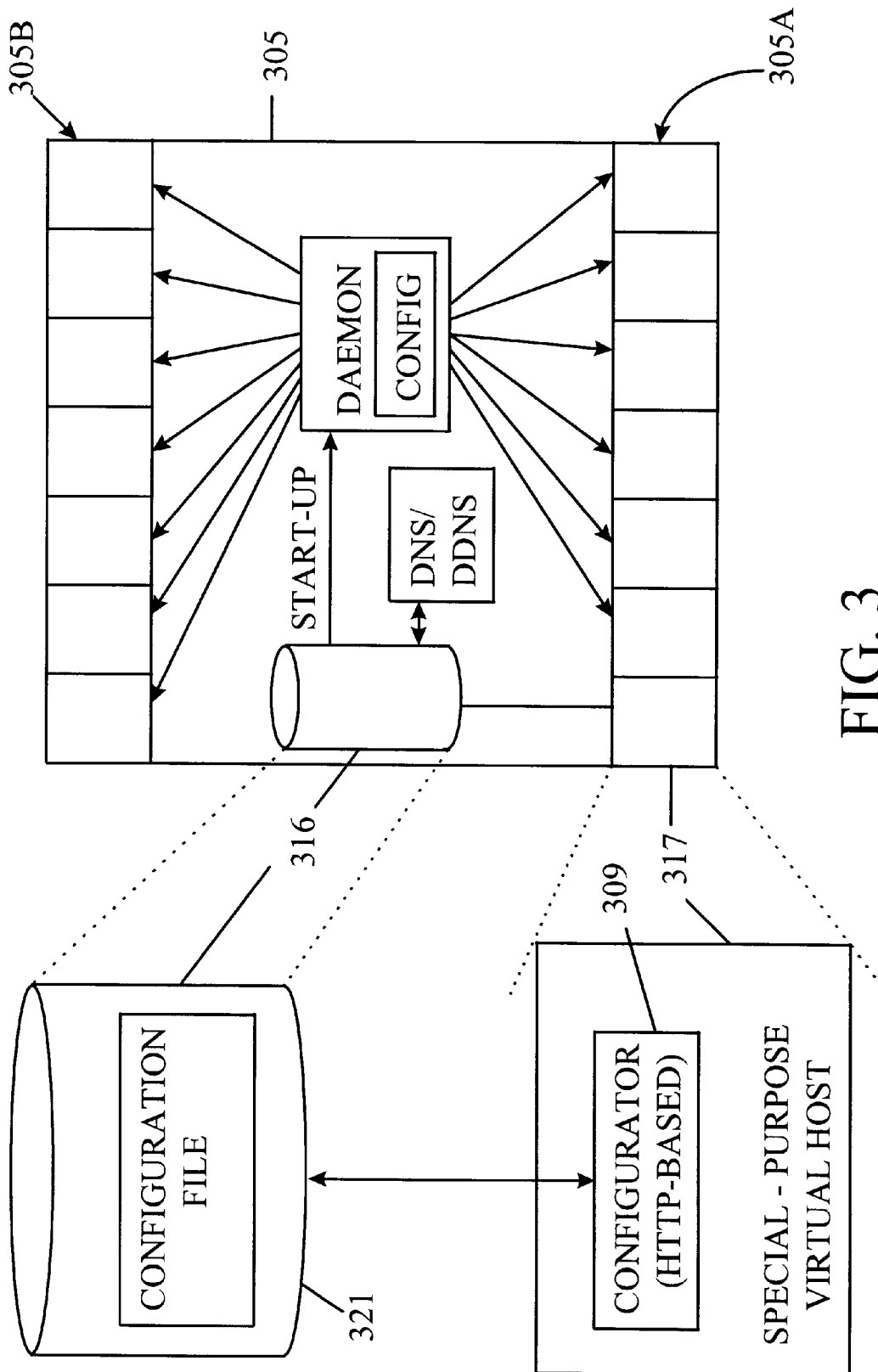
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