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Huang et al.

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(54) **METHOD AND APPARATUS OF A COLLABORATIVE PROXY SYSTEM FOR DISTRIBUTED DEPLOYMENT OF OBJECT RENDERING**

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(51) **Int. Cl.**⁷ **G06F 15/16**

(52) **U.S. Cl.** **709/202; 709/201; 707/10; 707/104**

(58) **Field of Search** **709/202, 201, 709/303; 707/10, 104**

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,572,643	A	*	11/1996	Judson	709/218
5,673,322	A	*	9/1997	Pepe et al.	380/49
5,742,768	A	*	4/1998	Gennaro et al.	
5,751,957	A	*	5/1998	Hiroya et al.	709/203
5,793,964	A	*	8/1998	Rogers et al.	709/202
5,826,025	A	*	10/1998	Gramlich	709/217
5,862,481	A	*	1/1999	Kulkarni et al.	455/432
5,918,013	A	*	6/1999	Mighdoll et al.	709/217
6,122,666	A	*	9/2000	Beurket et al.	709/226
6,275,937	B1	*	8/2001	Hailpern et al.	713/188

OTHER PUBLICATIONS

“MIME (Multipurpose Internet Mail Extensions) Part One: Mechanisms for Specifying and Describing the Format of Internet Message Bodies,” Network Working Group N. Borenstein Request for Comments: 1521 Bellcore, Obsoletes: 1341, Category: Standards Track, pp. 1–75 (Sep. 1993). T. Krauskopf, J. Miller, P. Resnick and W. Tresse, “PICS Label Distribution Label Syntax and Communication Protocols,” Version 1.1, REC–PICS,labels–961031, W3C Recommendation, pp. 1–31 (Oct. 31, 1996).

C. Evans, C.D.W. Feather, A. Hopmann, M. Presler–Marshall, and Paul Resnick, “PICSRules 1.1,” Last Modified Aug. 28, 1997, pp. 1–23.

Group WatchDog Version 1.2, User’s Guide, Feb. 16, 1994, Group Wege & Partner EDV–Unternehmensberatung GmbH, Karlsruhe.

Ortega, A. et al., A Framework for Optimization of a Multiresolution Remote Image Retrieval System, IEEE 1994, pp. 672–679.

Wallace, Gregory, “The JPEG Still Picture Compression Standard”, IEEE, vol. 38, No. 1, Feb. 1992, 17 pgs.

Fox, Armando et al., “Adapting to Network and Client Variation Using Infrastructural Proxies: Lessons and Perspectives”, IEEE, Aug. 1998, pp. 10–19.

* cited by examiner

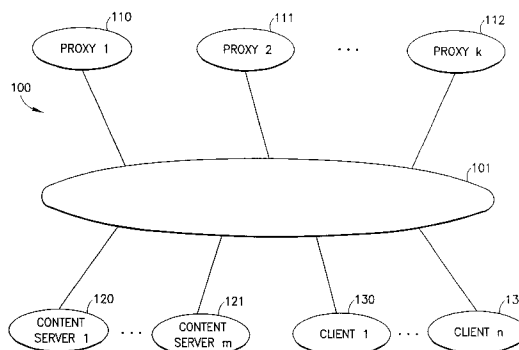
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(57) **ABSTRACT**

A distributed object rendering method and system for a collaborative data network is disclosed. The data network, which may include the Internet, has attached computing nodes, including object requestor nodes, object source nodes, and intermediate nodes which may be proxy servers. The method can allow each participating proxy server to adapt to the dynamic load conditions of itself as well as proxies, as well as to dynamic traffic conditions in the data network. The determination of which proxy or set of proxies is to perform object rendering and caching is based on a distributed, collaborative method that is adopted among the proxies. The criteria for such a method can include the bandwidth and current load of the network links among proxies, and/or the respective CPU usage of the proxies. If an object rendering can be staged, e.g., different resolution rendering, it can be performed by more than one of the proxies. The determination of which proxy performs which stage of the multistage rendering can also be adaptive to the dynamic load conditions, as well as network conditions.

41 Claims, 5 Drawing Sheets



Akamai Ex. 1005

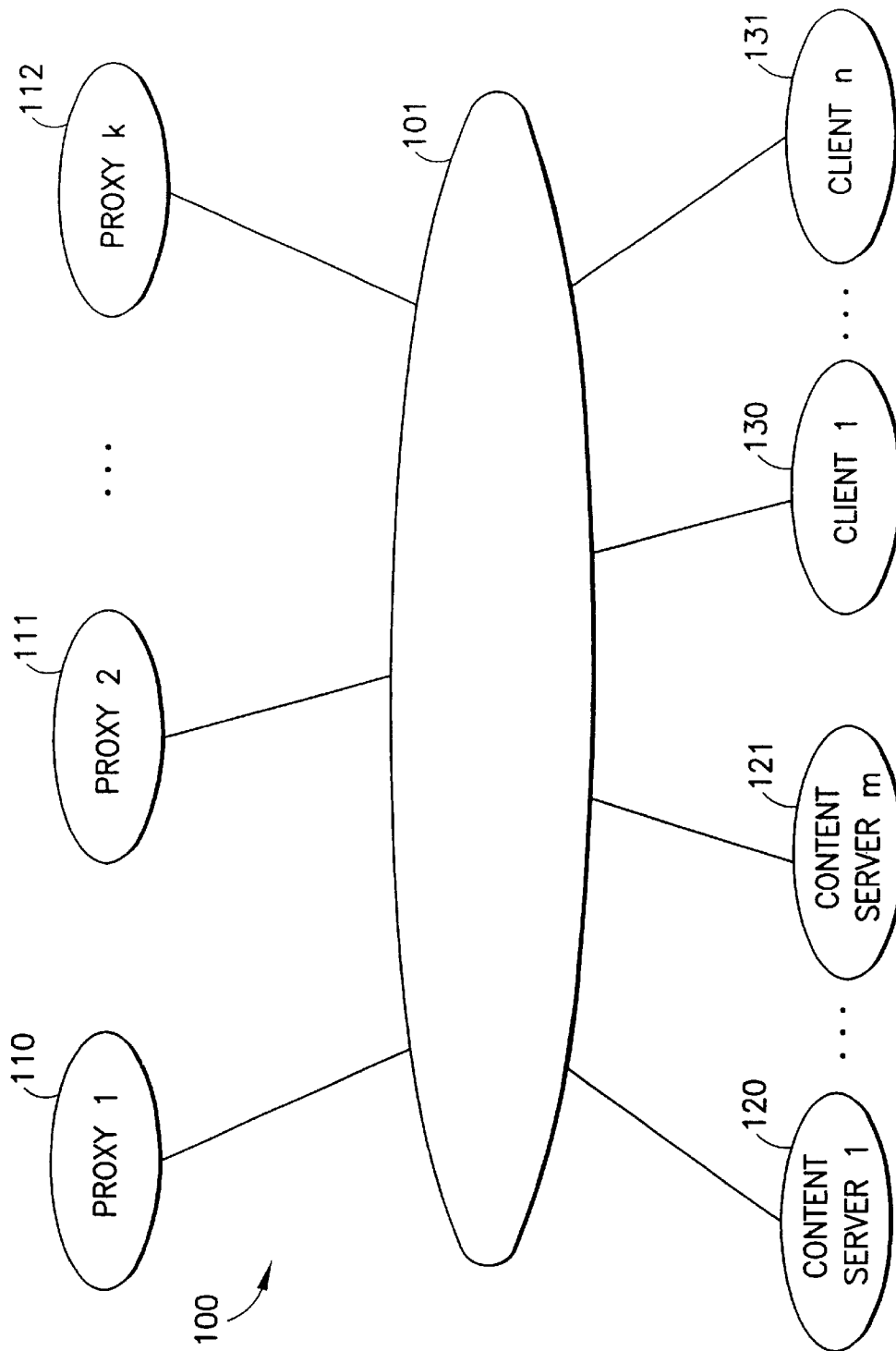


FIG.1

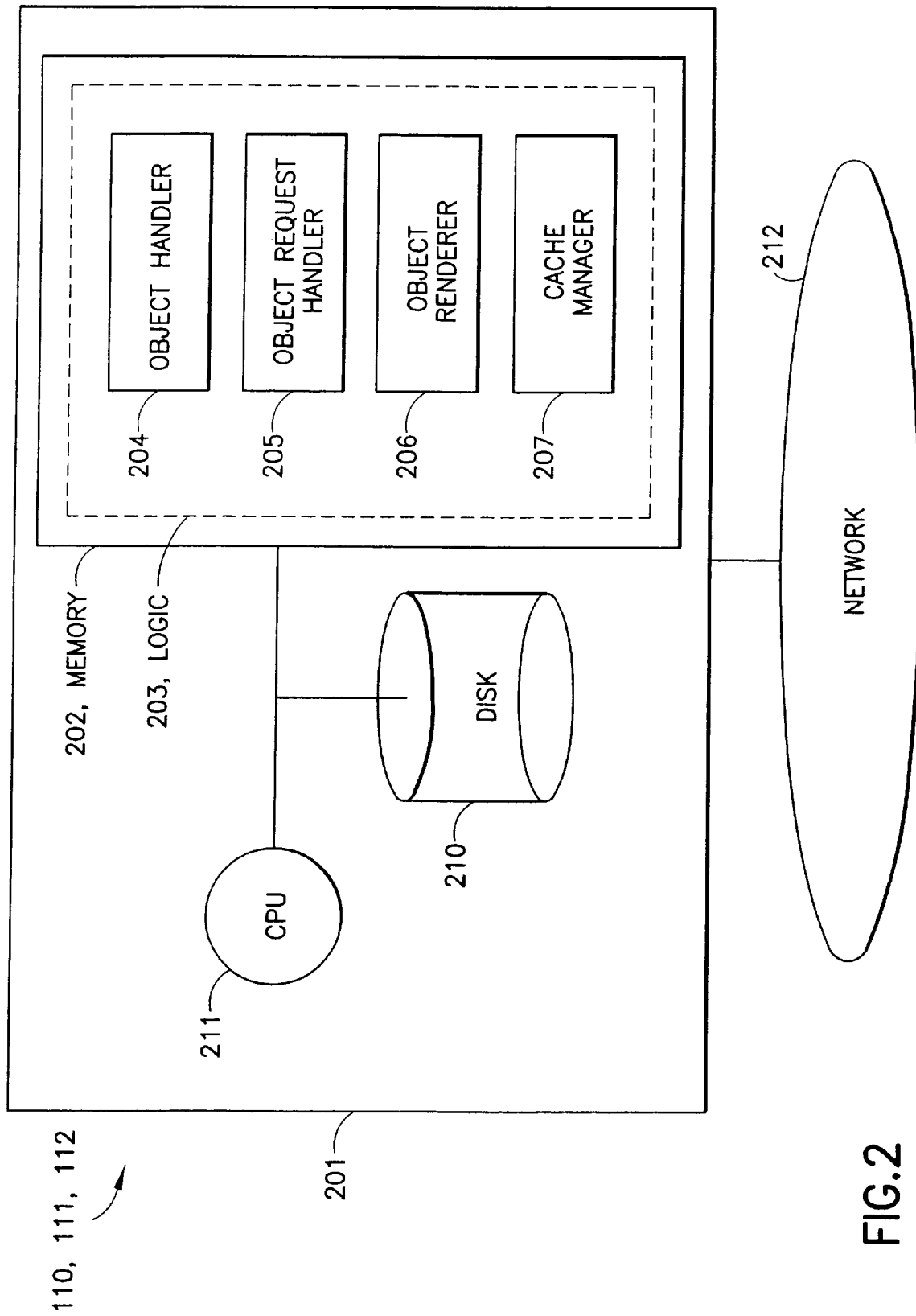


FIG.2

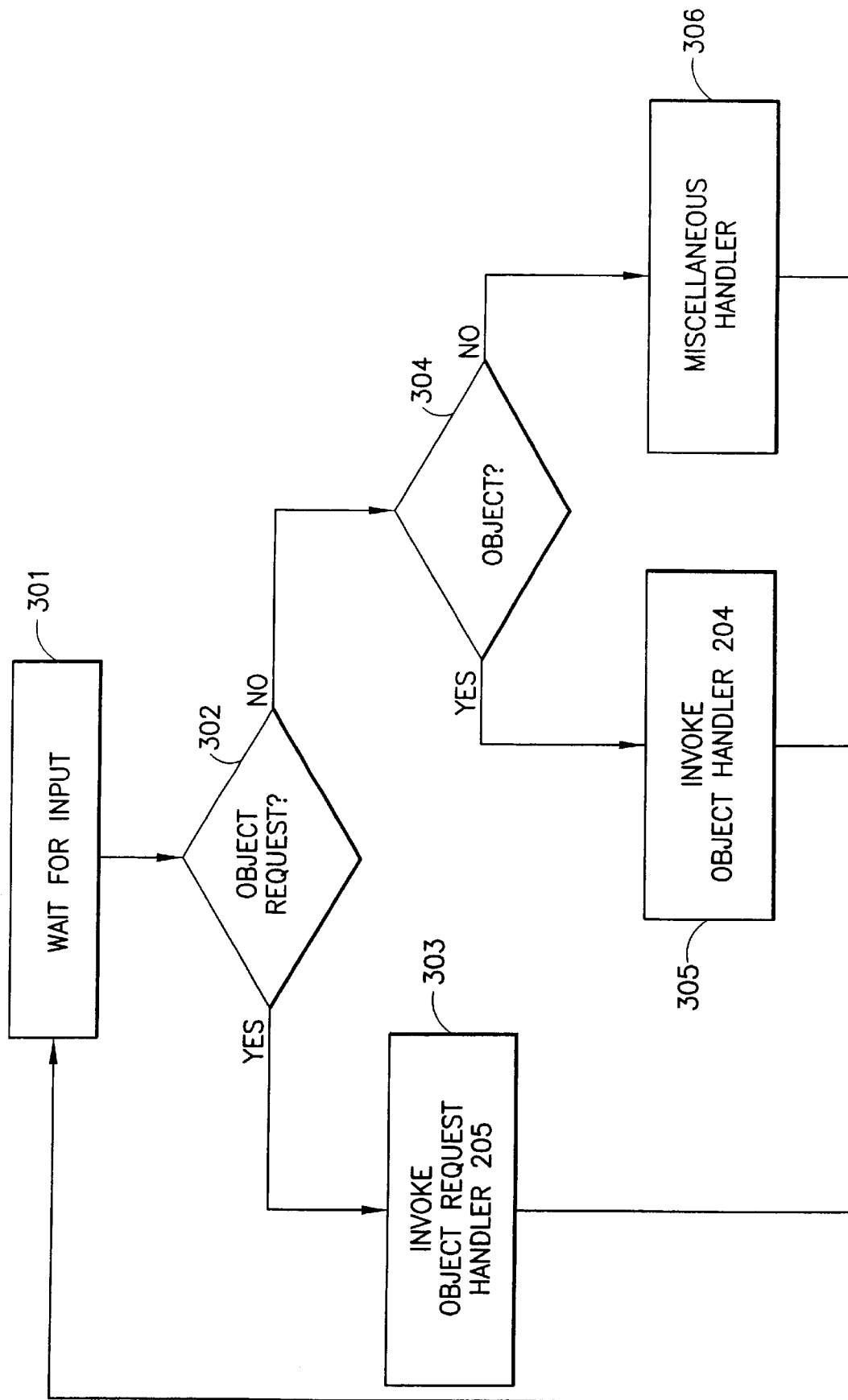


FIG.3

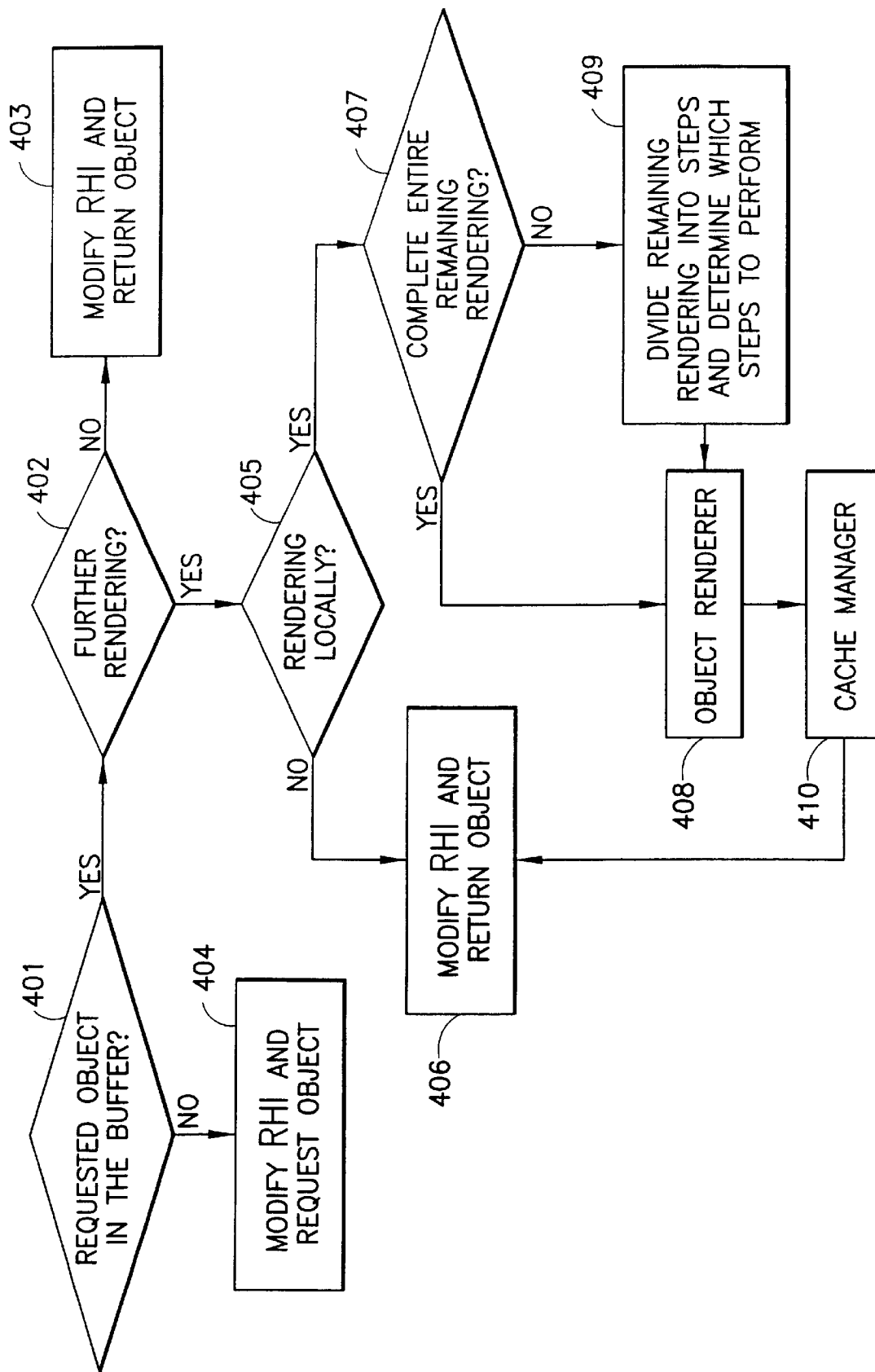


FIG. 4

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