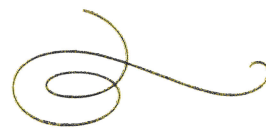


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The Director

of the United States Patent and Trademark Office has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this United States

Patent

grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

Anders Ivarsson

DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE



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(54) **VACUUM TUBE AUDIO AMPLIFIER**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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H03F 1/04 (2006.01)

G10H 3/18 (2006.01)

H03F 1/32 (2006.01)

H03F 3/02 (2006.01)

H03F 3/72 (2006.01)

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CPC **H03F 3/181** (2013.01); **G10H 3/187** (2013.01); **H03F 1/04** (2013.01); **H03F 1/327** (2013.01); **H03F 3/02** (2013.01); **H03F 3/72** (2013.01); **H03F 2200/411** (2013.01)

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CPC ... **H03F 3/181**; **H03F 1/04**; **H03F 1/30**; **H03F 1/565**; **H03F 1/327**; **G10H 3/187**
USPC **330/49**, **70**, **129**, **118**, **188**; **381/120**; **700/94**

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,644,289 A * 2/1987 Kennedy H03G 3/22

330/118

5,838,196 A * 11/1998 Yoshizawa H03F 1/565

330/188

2010/0033245 A1 * 2/2010 Arrowsmith H03F 1/30

330/129

2017/0312783 A1 * 11/2017 Ahn H03K 17/08

FOREIGN PATENT DOCUMENTS

CN 201590308 * 9/2010 H01F 27/245

OTHER PUBLICATIONS

GMArts, Guitar Amp Basics, Jun. 18, 2017, Internet Archive Wayback Machine—<https://web.archive.org/web/20170618053324/http://www.gmart.org/index.php?go=212>, all pages/entire document pertinent.*

(Continued)

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(57)

ABSTRACT

The present invention provides a vacuum tube audio amplifier which includes an audio pre-amplifying portion and an audio output transforming portion. The audio pre-amplifying portion includes an equalizer for enhanced sound quality and amplifies an audio signal, which is subsequently transmitted to the audio output transforming portion. Furthermore, the audio output transforming portion includes an audio output transformer which includes a plurality of stacked E-shaped silicon steel sheets and a plurality of

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