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UNITED STATES DISTRICT COURT

CENTRAL DISTRICT OF CALIFORNIA – WESTERN DIVISION

THE BENSON AVENUE COMPANY LLC, a Washington State limited liability company, Plaintiff, v. ARRI Americas Inc., a Delaware corporation, Defendant.	Case No. **COMPLAINT FOR [1] PATENT INFRINGEMENT; [2] ACTIVE INDUCEMENT OF PATENT INFRINGEMENT; AND [3] CONTRIBUTORY INFRINGEMENT** JURY TRIAL DEMANDED

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Plaintiff The Benson Avenue Company, LLC ("Benson Avenue") for this Complaint against Defendant ARRI Americas Inc. ("ARRI") alleges as follows:

NATURE OF THE ACTION

1. This is an action for patent infringement seeking to remedy ARRI's ongoing disregard for Benson Avenue's patent rights through the manufacture, use, sale, offer for sale, rental, leasing, licensing, and importation of motion picture post-production equipment that infringes Benson Avenue's U.S. Patent No. 9,830,945 ("the '945 patent"). Indeed, ARRI's infringing activity has continued even after Benson Avenue provided notice to ARRI of the '945 patent. This action seeks a permanent injunction and the recovery of monetary damages stemming from ARRI's infringement of the '945 patent.

PARTIES

2. Plaintiff Benson Avenue is a company incorporated under the laws of the State of Washington with a place of business in Seattle, Washington.

3. Defendant ARRI is a company incorporated under the laws of Delaware that is registered with the California Secretary of State to do business in California and having a place of business in Burbank, California.

JURISDICTION AND VENUE

4. This is an action for patent infringement arising under the patent laws of the United States, 35 U.S.C. § 1 *et seq*., including §§ 271 and 281. This Court

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has original jurisdiction over this patent-infringement action under 28 U.S.C. §§ 1331 and 1338(a).

5. Venue is proper in this Court at least because ARRI has a place of business in the Central District of California and is responsible for infringement occurring in the Central District of California, as alleged in this Complaint, and has delivered or caused to be delivered infringing products or services in the Central District of California.

BACKGROUND

6. Benson Avenue is an innovative developer of technologies that revolutionized audio digital encoding, distribution, and storage of audio media. Through technologies owned and developed by Benson Avenue, original analog audio source media can be digitized, transferred, archived, and shared in a digital file that can be replayed without standard losses associated with conventional digital encoding of an analog source.

7. Benson Avenue is the owner by assignment of the ’945 patent. Entitled “ENCODING, DISTRIBUTION AND REPRODUCTION OF AUDIO MEDIA USING MECHANICAL IMAGE DIGITIZATION,” the ’945 patent was issued on November 28, 2017. A true and accurate copy of the ’945 patent is attached to this Complaint as **Exhibit A**.

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8. The ’945 patent discloses and claims technology that solved problems associated with conventional digital encoding of original analog source media, such as vinyl or magnetic tape. Conventional digital encoding used lossy systems, meaning that the original components of the continuous analog audio signal were sampled at intervals to create a digitized signal that was merely an estimate of the original analog signal contained within the original analog source media.

9. Prior to the inventions claimed in the ’945 patent, there was an increasing demand for higher quality audio recordings from original analog media, which led to a resurgence in the popularity of vinyl recordings. However, the problem of convenient distribution and storage of the original analog audio media remained.

10. Prior to the inventions claimed in the ’945 patent, skilled artisans sought to satisfy the demand for higher quality recordings from original analog source media by making improvements to digital scanning processes, but relatively little improvement was made.

11. Prior to the inventions claimed in the ’945 patent, skilled artisans sought to satisfy the demand for higher quality recordings from original analog source media through the use and distribution of vinyl LP recordings, high-density cassette tapes, and compact discs, but these all failed to satisfy a long-felt need in

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the industry for higher quality recordings from original analog source media that could be directly distributed.

12. Through use of the inventions claimed in the ’945 patent, the long-felt need in the industry for higher quality recordings from original analog source media that could be directly distributed was finally met.

THE INVENTIONS CLAIMED IN THE ’945 PATENT

13. The inventions disclosed and claimed in the ’945 patent include a system for maintaining quality of audio recordings, comprising:

a. wherein the audio recording is an original audio source media recording, containing original analog recording audio

b. a mechanical production system for producing a mechanical image of the original audio source media recording

c. a processing system for encoding the mechanical image information into a digital image file comprising an image structure and control information to enable audio reproduction of the original audio from the digital image file, the digital image file being capable of being transmitted or stored

d. a processing system for recovering the mechanical image information in the digital image file, and

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e. audio processing circuitry to produce the original analog recording audio from the recovered mechanical image information without standard losses associated with digital encoding of an analog source.

ARRI'S INFRINGING CONDUCT

14. Beginning sometime after the publication and issue of the '945 patent and, on information and belief, before approximately May 2019, ARRI incorporated technology into its ARRISCAN™ film scanner, a device used to digitize and remaster film, including film that has original analog audio source media. On information and belief, the improved ARRISCAN film scanner is sold under the name "ARRISCAN XT."

15. On information and belief, ARRISCAN XT film scanners are made abroad by ARRI, imported into the United States, and then subsequently sold, leased, licensed, or rented by ARRI in the United States, including within this judicial district.

16. The ARRISCAN XT film scanner includes technology designed to digitize analog sound recorded on film using specialized hardware and software.

17. The ARRISCAN XT optically scans film having original audio source media, namely, analog audio recorded on film in the form of an optical soundtrack.

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The ARRISCAN XT creates an image of the optical soundtrack and saves that image digitally in the form of a DPX or TIFF file.

18. The ARRISCAN XT processes the image file of the original optical soundtrack into a digital format that can be played directly from image files in real time without standard losses associated with digital encoding of an analog source.

19. The ARRISCAN XT contains all elements literally or under the doctrine of equivalents of at least Claim 1 of the ’945 patent.

20. On or about May 18, 2023, Benson Avenue notified ARRI of its infringement of the ’945 patent by a letter sent through counsel. ARRI acknowledged receipt of the letter on or around June 16, 2023.

21. Despite being on notice of its infringement of the ’945 patent, ARRI continues to make, sell, offer for sale, rent, lease, and license the ARRISCAN XT containing functionality that causes the device to infringe the ’945 patent.

CLAIMS FOR RELIEF

Count I (Direct Infringement)

22. Benson Avenue incorporates by reference the allegations contained in the preceding paragraphs as if separately alleged here.

23. Under 35 U.S.C. § 271(a) ARRI has infringed and continues to infringe literally or under the doctrine of equivalents at least Claim 1 of the ’945

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patent by making, using, selling, offering for sale, and importing the ARRISCAN XT.

24. Benson Avenue has sustained damages as a direct and proximate result of ARRI's direct infringement and is entitled to damages pursuant to 35 U.S.C. § 284.

25. ARRI's direct infringement as alleged herein has caused, and unless enjoined by this Court under 35 U.S.C. § 283, will continue to cause Benson Avenue irreparable harm for which it cannot be adequately compensated by a monetary award.

Count II (Active Inducement)

26. Benson Avenue incorporates by reference the allegations contained in the preceding paragraphs as if separately alleged here.

27. Under 35 U.S.C. § 271(b), ARRI has taken affirmative steps to bring about the direct infringement literally or under the doctrine of equivalents by others, namely by supplying advertising materials, technical documentation, and technical support, that has actively encouraged use of the ARRISCAN XT by others in an infringing manner.

28. Affirmative steps taken by ARRI to encourage others to directly infringe at least Claim 1 of the '945 patent were taken by ARRI with knowledge of the '945 patent and with the understanding that use by others of the ARRISCAN

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XT in accordance with ARRI's advertisements, technical documentation, and technical support would infringe at least Claim 1 of the '945 patent, or, alternatively, that there was a sufficiently high probability that such use by others would directly infringe at least Claim 1 of the '945 patent.

29. Benson Avenue has sustained damages as a direct and proximate result of ARRI's active inducement and is entitled to damages pursuant to 35 U.S.C. § 284.

30. ARRI's active inducement as alleged herein has caused, and unless enjoined by this Court under 35 U.S.C. § 283, will continue to cause Benson Avenue irreparable harm for which it cannot be adequately compensated by a monetary award.

COUNT III (Contributory Infringement)

31. Benson Avenue incorporates by reference the allegations contained in the preceding paragraphs as if separately alleged here.

32. Under 35 U.S.C. § 271(c), ARRI has sold or offered for sale in the United States, components of the ARRISCAN XT, either for replacement or for use in making upgrades. On information and belief these components include specialized hardware and software packages that enable use of the ARRISCAN device in a manner that infringes at least Claim 1 of the '945 patent. On information and belief, these specialized software or hardware components are not

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staple articles of commerce having substantially non-infringing uses and they were supplied by ARRI with knowledge of the '945 patent and with knowledge that the components were especially made or adapted for use in an infringing manner.

33. Benson Avenue has sustained damages as a direct and proximate result of ARRI's contributory infringement and is entitled to damages pursuant to 35 U.S.C. § 284.

34. ARRI's contributory infringement as alleged herein has caused, and unless enjoined by this Court under 35 U.S.C. § 283, will continue to cause Benson Avenue irreparable harm for which it cannot be adequately compensated by a monetary award.

PRAYER FOR RELIEF

WHEREFORE, Benson Avenue respectfully requests this Court to:

A. Enter judgment in Benson Avenue's favor and against ARRI on all Counts of this Complaint;

B. Enter an order permanently enjoining ARRI and each of its respective officers, agents, servants, employees, and attorneys and all of those persons in active concert or participation with it, from infringing the '945 patent directly or from engaging in conduct as alleged herein that constitutes active inducement or contributory infringement.

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C. Award it damages sufficient to compensate Benson Avenue for the direct infringement, active inducement, and contributory infringement as alleged herein pursuant to 35 U.S.C. § 284, together with prejudgment interest and costs;

D. Award it treble damages for ARRI's willful infringement plus reasonable attorneys' fees and costs pursuant to 35 U.S.C. § 285 and a finding that this case is exceptional; and

E. Order such other and further relief as the Court may deem just and proper.

JURY DEMAND

Benson Avenue demands a trial by jury on all issues properly tried to a jury.

DATED: August 23, 2024

Lowe Graham Jones PLLC

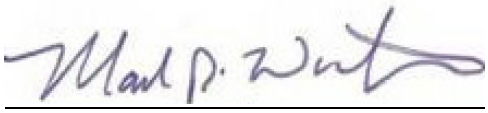
By: 

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Exhibit A

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US009830945B2

(12) **United States Patent**
Morgan

(10) **Patent No.: US 9,830,945 B2**
(45) **Date of Patent: Nov. 28, 2017**

(54) **ENCODING, DISTRIBUTION AND REPRODUCTION OF AUDIO MEDIA USING MECHANICAL IMAGE DIGITIZATION**

(71) Applicant: **Terence C. Morgan**, Tukwila, WA (US)

(72) Inventor: **Terence C. Morgan**, Tukwila, WA (US)

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

(21) Appl. No.: **14/926,472**

(22) Filed: **Oct. 29, 2015**

(65) **Prior Publication Data**

US 2017/0125054 A1 May 4, 2017

(51) **Int. Cl.**

G11B 11/00	(2006.01)
G11B 20/22	(2006.01)
G11B 20/04	(2006.01)
G11B 20/10	(2006.01)

(52) **U.S. Cl.**

CPC ***G11B 20/22*** (2013.01); ***G11B 20/04*** (2013.01); ***G11B 20/10527*** (2013.01); *G11B 2020/10546* (2013.01)

(58) **Field of Classification Search**

None

See application file for complete search history.

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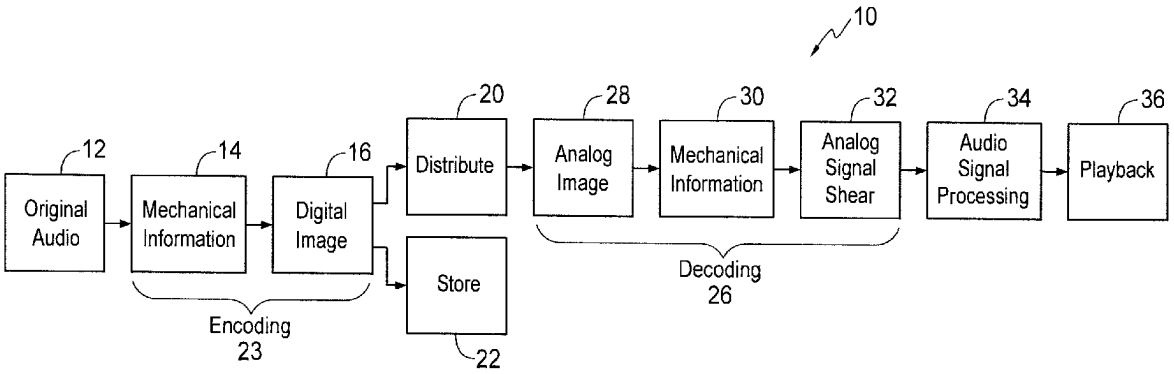
* cited by examiner

Primary Examiner — Tan X Dinh
(74) *Attorney, Agent, or Firm* — Clark A. Puntigam; Jensen & Puntigam, P.S.

(57) **ABSTRACT**

The system and corresponding process includes a system for producing a mechanical image of original audio source media and a system for encoding the mechanical image information into a digital file. A processing system recovers the mechanical image information from the digital file at a receiving end. Audio processing is used to produce the original audio source material without the standard losses associated with digital encoding of audio material.

16 Claims, 11 Drawing Sheets



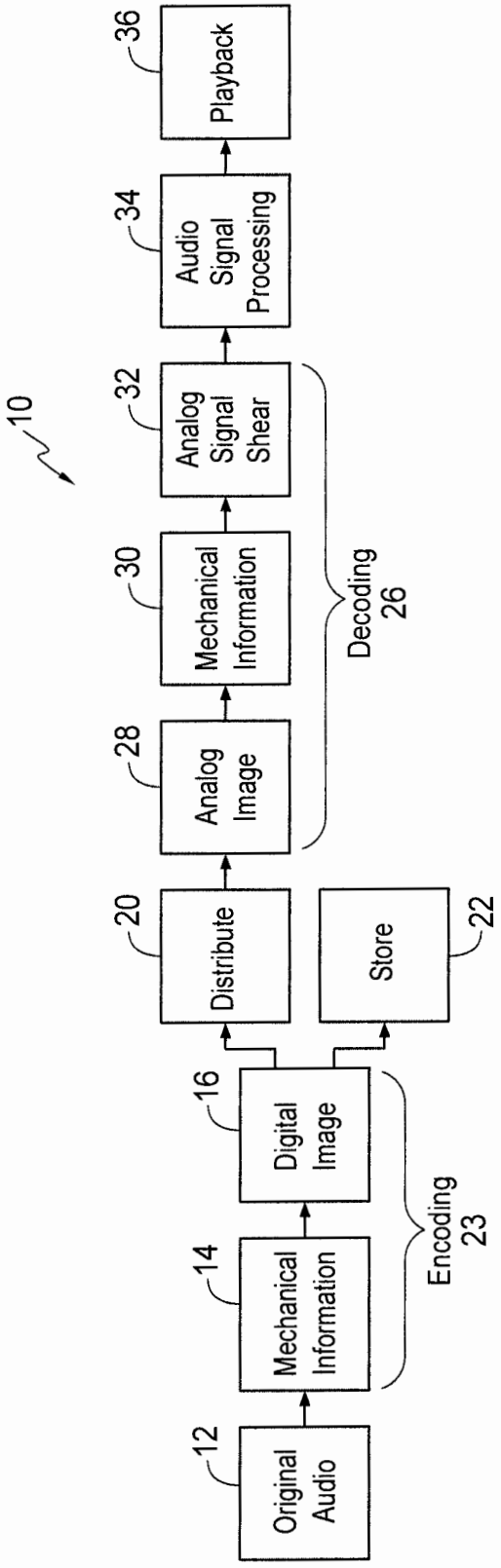

10
12
Original Audio
14
Mechanical Information
16
Digital Image
20
Distribute
22
Store
23
Encoding
26
Decoding
28
Analog Image
30
Mechanical Information
32
Analog Signal Shear
34
Audio Signal Processing
36
Playback

FIG. 1

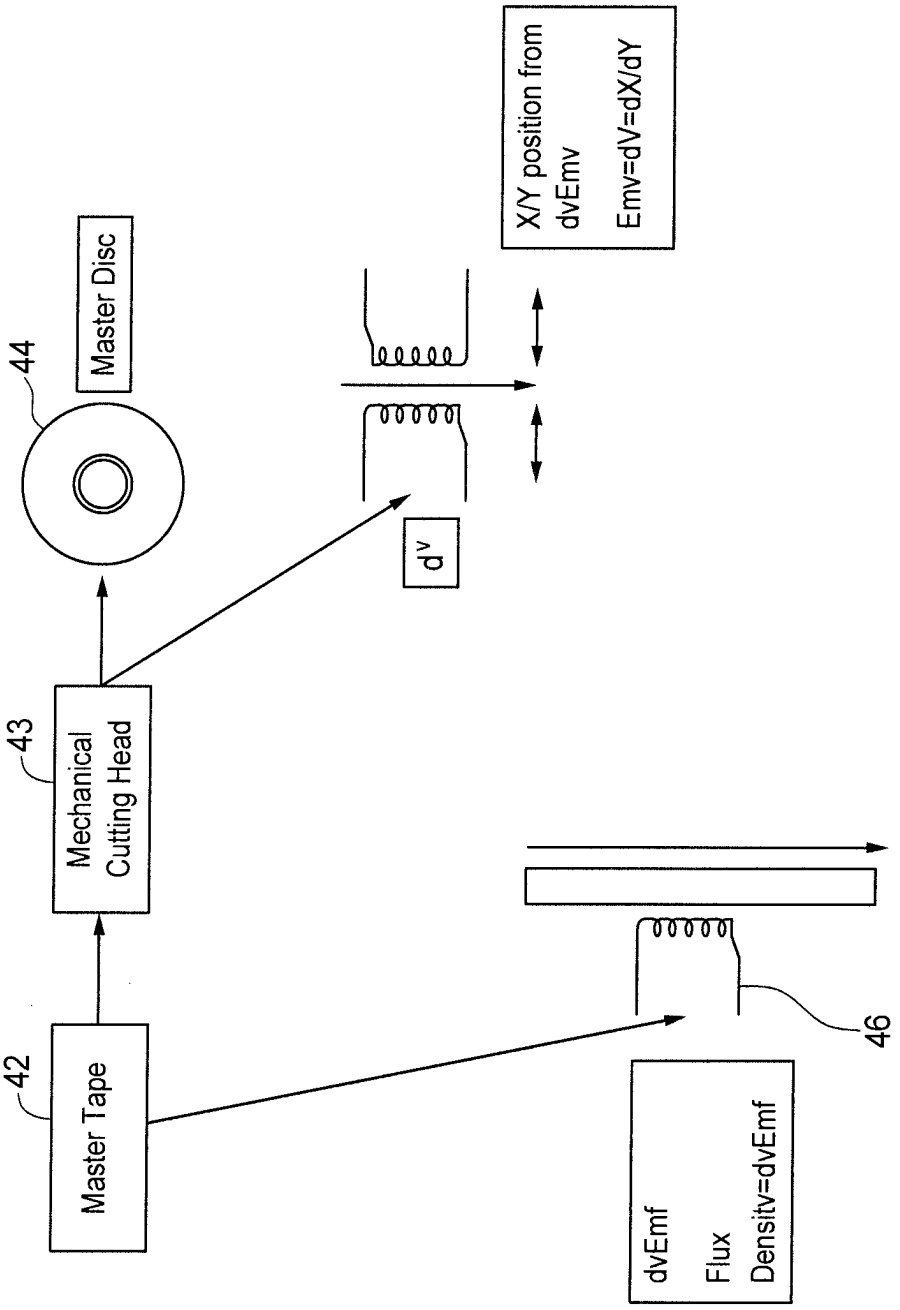

Master Tape
42
Mechanical Cutting Head
43
Master Disc
44
dv
X/Y position from dvEmv
Emv=dV=dX/dY
46
dvEmf
Flux Density=dvEmf

FIG. 2

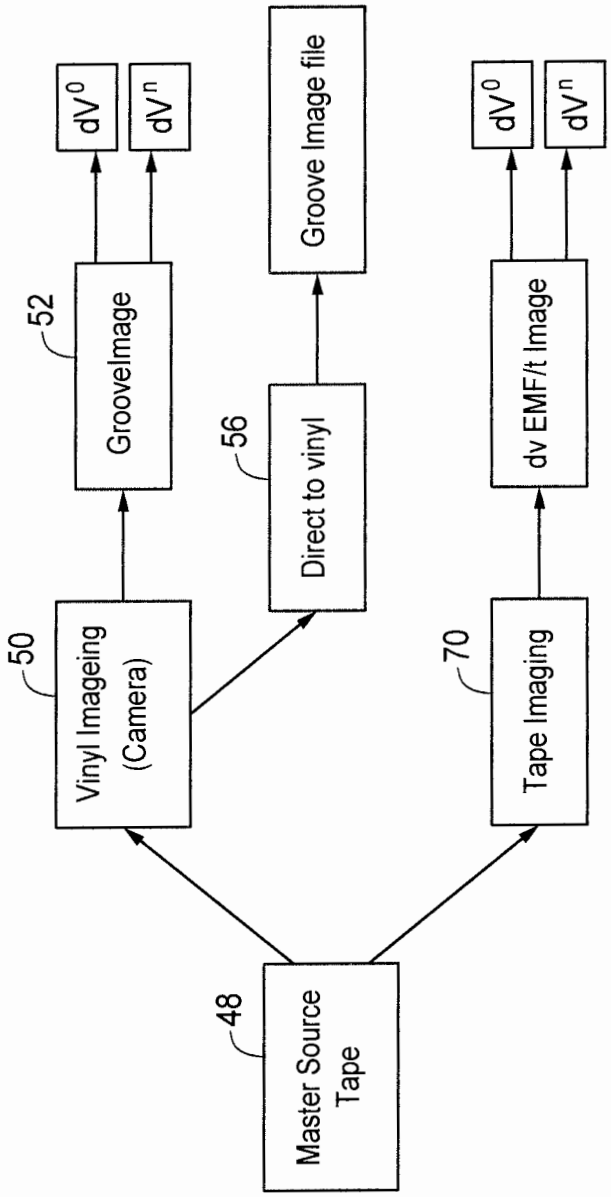

Master Source Tape
48
Vinyl Imageing (Camera)
50
GrooveImage
52
Direct to vinyl
56
Groove Image file
Tape Imaging
70
dv EMF/t Image
dV0
dVn
dV0
dVn

FIG. 3

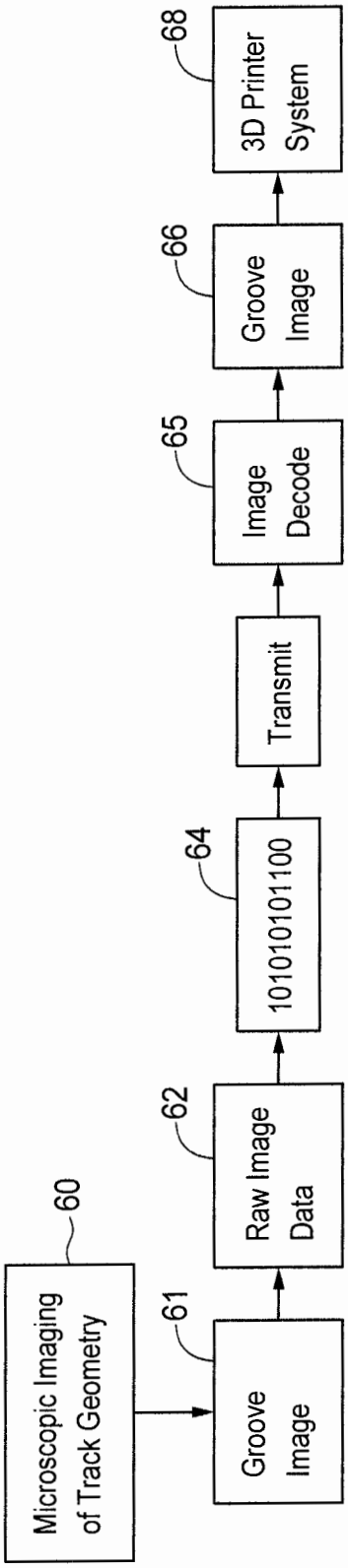

Microscopic Imaging of Track Geometry
60
Groove Image
61
Raw Image Data
62
101010101100
64
Transmit
Image Decode
65
Groove Image
66
3D Printer System
68

FIG. 4

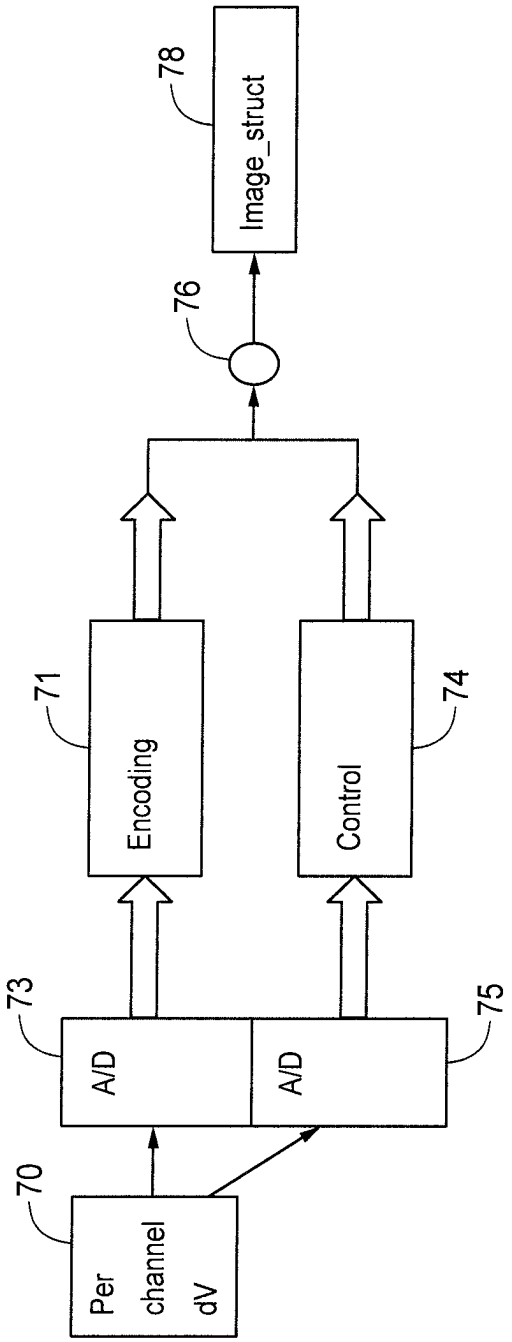

78
Image_struct
76
71
Encoding
74
Control
73
A/D
75
A/D
70
Per channel dV

FIG. 5

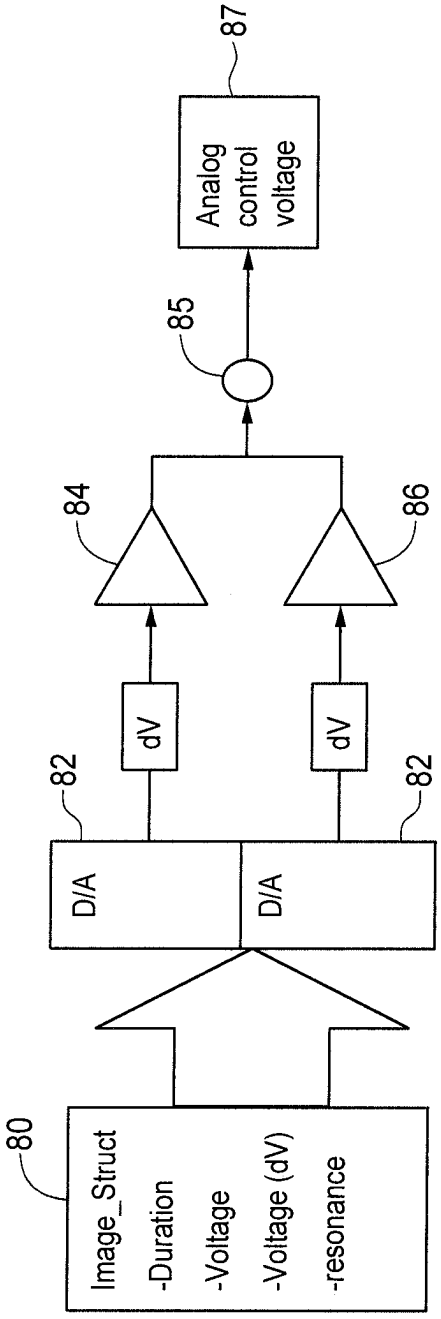

87
Analog control voltage
85
84
86
dV
dV
82
82
D/A
D/A
80
Image_Struct
-Duration
-Voltage
-Voltage (dV)
-resonance

FIG. 6

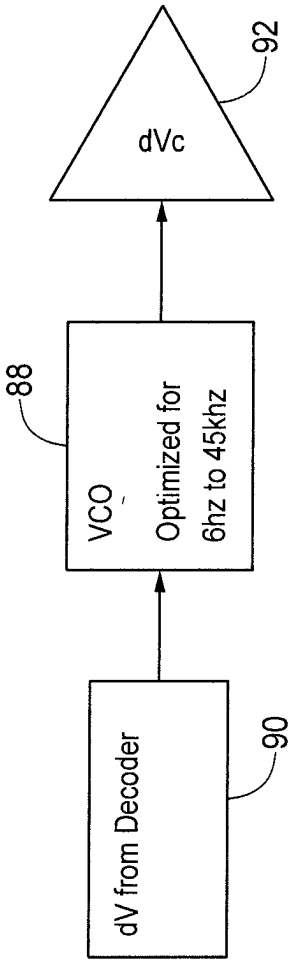


FIG. 7

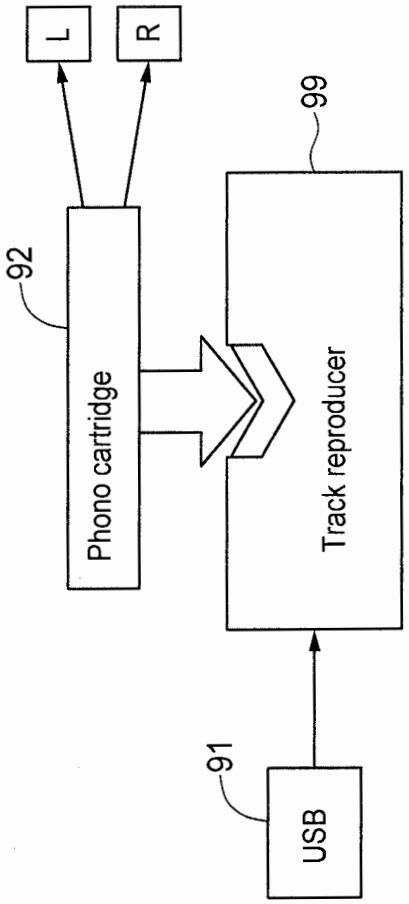


FIG. 8

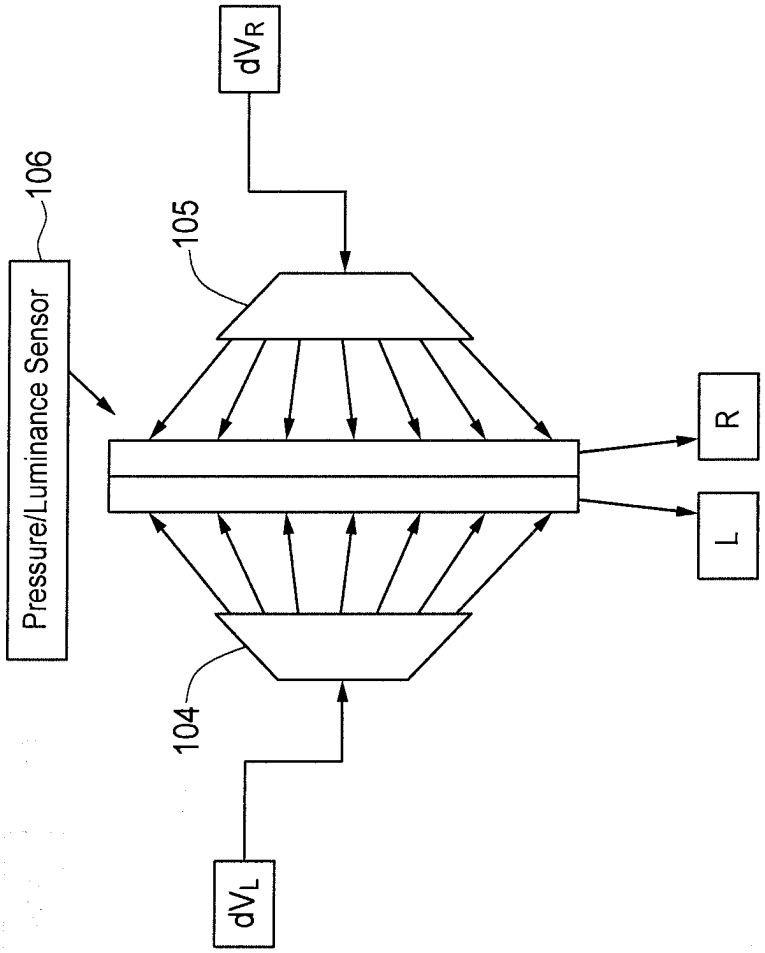


FIG. 9

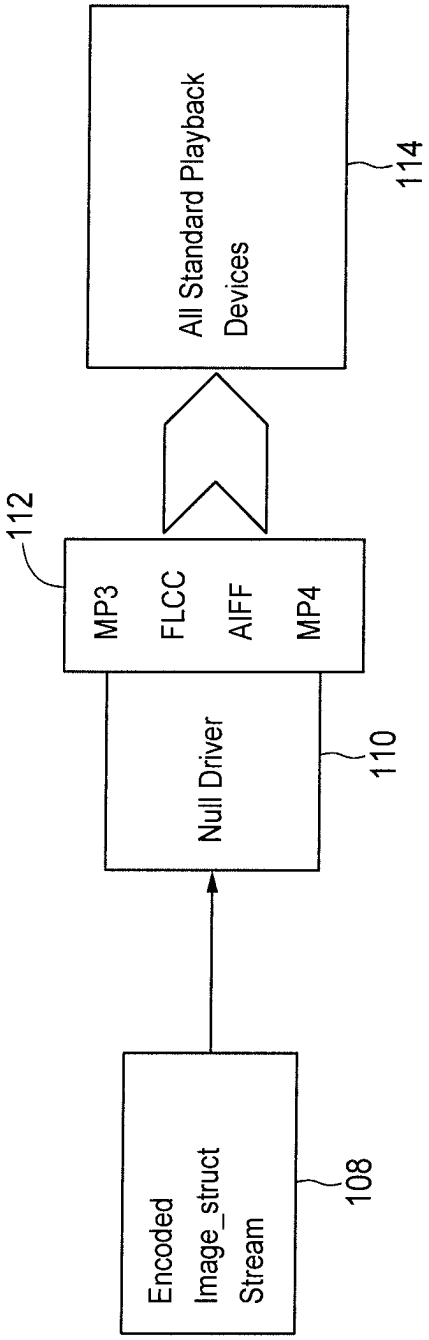

All Standard Playback Devices
114
112
MP3
FLCC
AIFF
MP4
Null Driver
110
Encoded Image_struct Stream
108

FIG. 10

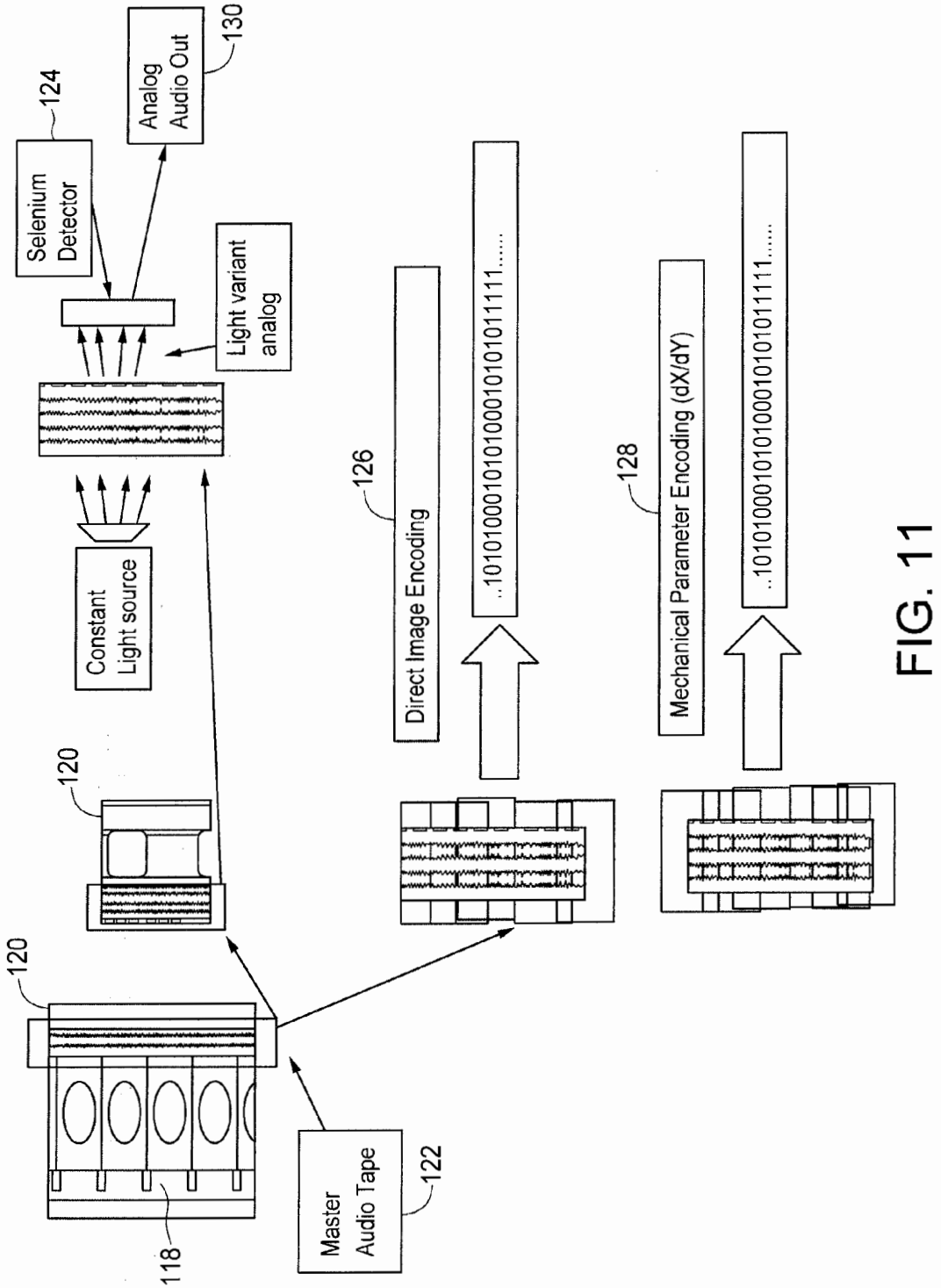

Analog Audio Out
130
124
Selenium Detector
Light variant analog
Constant Light source
120
120
118
Master Audio Tape
122
126
Direct Image Encoding
..1010100010101000101010111111.....
128
Mechanical Parameter Encoding (dX/dY)
..1010100010101000101010111111.....

FIG. 11

ENCODING, DISTRIBUTION AND REPRODUCTION OF AUDIO MEDIA USING MECHANICAL IMAGE DIGITIZATION

TECHNICAL FIELD

This invention relates generally to digital encoding, distribution and storage of audio media while maintaining the quality of the original audio media.

BACKGROUND OF THE INVENTION

Audio media, in the form of original audio tapes and discs provides the highest quality recorded audio experience. Conventional digital encoding and reproduction of audio media from the digital format has the advantage of fast and convenient distribution and storage of audio media, enabling the widespread enjoyment of audio media. However, conventional digitization of audio media has come at the cost of the quality of the original audio. All current analog media digitization techniques rely on 100% lossy systems, meaning that no original component of the original analog audio signal remains in the digitized signal. The reproduced playable audio version is a 100% estimated version of the original audio signal. In terms of the audio spectral realism, almost, 45 db of the original dynamic headroom is no longer present.

As a result, there is an increasing demand for higher quality audio, and this has led to a resurgence in the popularity of vinyl recordings. However, the problem of convenient distribution and/or storage of the original analog audio media remains. The demand for higher quality audio in the distribution market has been directed toward improvements in digital signal processing of the original analog audio, but relatively little improvement has been achieved. One alternative is the offering of a vinyl LP or a high-density cassette tape, which contains the original audio along with compact disc and digital streaming media distribution options. This still does not satisfy the quality issue of directly distributed digital media.

It is hence desirable to maintain the quality of the original audio recording while having the capability of digital distribution and storage.

SUMMARY OF THE INVENTION

Accordingly, the present invention is a system and corresponding process for maintaining quality of audio recordings, comprising: a mechanical production system for producing a mechanical image of original audio source media; a processing system for encoding the mechanical image information into a digital file capable of being transmitted or stored; a processing system for recovering the mechanical image information or from digital information in the digital file; and audio processing circuitry to produce the original audio source media without standard losses associated with digital encoding.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram of the system and process of the present invention.

FIG. **2** is a block diagram of the various types of mechanical images produced from a master audiotape recording.

FIG. **3** is a block diagram showing several alternatives of the system of the present invention.

FIG. **4** is a more specific block diagram of one alternative.

FIG. **5** is a diagram showing encoding for the systems for FIG. **3**.

FIG. **6** is a block diagram showing the digital to analog conversion at a receiving end of the system.

FIG. **7** is a block diagram of one embodiment of audio processing at the receiving end.

FIG. **8** is a block diagram of another audio processing embodiment.

FIG. **9** is a block diagram of another audio processing embodiment.

FIG. **10** is a block diagram of an image stream for playback at a receiving end.

FIG. **11** is a block diagram showing encoding from film.

DETAILED DESCRIPTION OF THE INVENTION

As indicated above, current distribution of digitized audio media results in a 100% loss of the original analog audio signal. While the media content may be encoded accurately, the inherent mechanical acoustic information is lost. The present invention is a system and a process which enables digital encoding, distribution and storage of analog audio media while retaining the original audio quality, specifically both the audio content and the mechanical acoustic information when reproduced and played. This is accomplished by an arrangement referred to herein as mechanical image digitization.

FIG. **1** illustrates in block diagram form the basic concept of the invention, showing generally at **10**. The original audio is represented at **12**. The mechanical information from the original audio is represented at **14**, specifically an image of the original mechanical process that created the media, including both vinyl and tape images. This image information is then digitized, as shown at **16**. This is referred to in combination herein as digital encoding **23**, i.e. digitization of the mechanical image information. The digital signal may be either distributed in same manner or stored as shown at **20** and **22**. This present digitizing of mechanical image information basically replaces the current system of digitizing the analog audio media by analog to digital converters, along with the possible use of various signal processing algorithms designed to improve quality. When the digital image is received at a play back location, such as a steaming destination, decoding occurs, referenced at **26**. Decoding in the present system is an analog **28** of the encoding process, using conventional digital to analog converter circuitry. The analog includes mechanical information **30** which is then processed into an analog stream of signals **32**. The analog stream of signals mirrors the original analog audio recording. The signals are then applied to audio transducers and to a conventional audio signal processing system for playback of the audio, shown at **34** and **36**, respectively. The playback system can take various forms, producing not only the original audio content but the original acoustic information, basically reproducing the original audio.

Accordingly, the present invention has the advantage of digital capability of convenient and fast distribution and/or storage, while retaining the original audio quality in playback.

FIG. **2** shows several types of mechanical images which may be used. An original audio recording can be produced in various venues, including a recording studio, performance hall or other venue. This is commonly referred to as a master tape **42**. The master tape is the original recorded audio material, i.e. stereo or multi-channel, which is then con-

verted to mechanical information which is normalized for various downstream reproduction processes.

In one example, a mechanical cutting head **43** is used to produce a master disc **44**. The master disc then is used to produce multiple vinyl copies.

Changes in the differential voltages d" drive electromagnetically the cutting head used in manufacturing the master disc. The geometry of the disk groove and the reproduced analog signal is directly proportional to the differential drive voltages of the original Emv of the master recording, minus the mechanical bandwidth reduction which occurs because of the mechanical limitations of phonographic recordings. The x/y position is determined by dvEmv, where Emv=dv=dx/dy.

Alternatively, as shown at **46**, the changes in the differential voltages are used to electromagnetically drive the production of varying densities of magnetic flux on magnetic tape. The geometry of the flux density and the reproduced analog signal are directly proportional to the differential drive voltage of the original Emf of the master recording minus the mechanical bandwidth reduction which occurs because of the mechanical limitation of tape flux density. The flux density=dvEmf.

Both of the above mechanical image processes, namely, the mechanical cutting head process and the magnetic tape flux density process are conventional and are hence not described herein in further detail.

Referring now to FIG. **3** in accordance with the present invention, the master source tape **48** containing the original audio media can be used to produce a vinyl image **50** in the form of a mechanical image of the actual track grooves of the vinyl master. This can be done by a camera or other photographic device. This image can be used either as an image copy for direct vinyl production **56** on a 3D printer, as discussed in more detail below, or other dimensional printing process with further encoding for the production of differential voltages.

Alternatively, the groove image can be processed for digital use. Groove image **52** represents a digital encoding of the parameters of the master track information including the x/y position of the mechanical image and other mechanical audio information, including resonance, peak rise times, etc, using various encoding techniques and geometric smoothing to maintain the spectral quality of the original analog source material. One encoding example is dictionary encoding, which can be accomplished in many different ways. Other examples include non-dictionary PPM and PAQ techniques: this encoding results in a standard distributable digital file consisting of the image structure and control information to enable reproduction with specific mechanical drivers as an audio signal. This arrangement is shown in FIG. **5**, described below.

The direct to vinyl arrangement **56** is shown in FIG. **4**. It includes a microscopic imaging **60** of the track geometry, which produces the actual groove image **61** from a vinyl long playing recording, resulting in a raw image file **62**. The raw image file contains the geometric data of the track image in any one of various standard image creating formats, e.g. jpg, bmp, represented at **64**. The image is then transmitted, downloaded as a digital file and decoded at a receiving end, shown at **65**. Standard image reproduction processes recreate the groove image, geometrically arranged to be an exact copy of the original track geometry, shown at **66**. The output is then provided to a 3D printer system or other dimensional printing device, shown at **68**, which can be played directly.

Again referring to FIG. **3**, the master source tape can also be used to produce a tape for reproduction purposes. The flux density on the tape is imaged at **70**. Digital encoding of the parameters of the master source tape, representing the tape flux density and other mechanical information resonance, peak use times etc. is accomplished using conventional encoding techniques and geometric smoothing, as discussed above with the groove image embodiment to produce a distributable digital file. The resulting voltages dv′/dv″ come from the dvEMF/t image.

Referring now again to FIG. **5**, each voltage dv channel, shown at **70**, produced by any one of the previous processes, e.g. track imaging, flux density or pattern geometry, from the mechanical image (dx/dy) results in an output structure which can be digitally distributed. The voltage changes (dv) per channel can be encoded using dictionary or other encoding **71**. The voltage control structures are stored in a sorted structures table with the output of the process stage being a list of pointers to the best fit structure for the encoding. The analog voltage is stored in a digital format in accordance with standard analog to digital conversion processing **73**. Control parameters, represented at **74**, with A/D processing at **75**, including other original media mechanical information and post processing control information are included for the signal control of the decoding process at the receiving end with post processing drivers and devices. The voltage and control information is shown in combination at **76**.

The resulting image structure **78** for digital to analog conversion at a receiving end of the digital transmission is shown in FIG. **6**. The image structure containing the mechanical differential data and control information necessary for driving the analog transducer devices or digital playback devices are shown as a group at **80**. The image structure information comprises voltage, duration and resonance information. This information is sent to digital to analog converters shown generally at **82**. These convert the digital image information into analog differential voltages (dv) to drive the output sections, i.e. a differential drive output **84** and a control gating and referencing circuit **86**. The output driver device shown in FIG. **6** is a VCO (voltage controlled oscillator) **85** controlled by the output of the control decoder and is representative of other driver arrangements, e.g. FET, selenium, photo drivers. An analog control voltage **87** results.

FIG. **7** shows a VCO **88** embodiment. A VCO receives a dv, differential voltage, **90** from the analog output of the digital to analog converter. The VCO is optimized for 20 Hz to 60 KHz in this embodiment. The output of VCO **88** is applied to a preamp/equalization circuit **92**.

Another example is a mechanical track reproducer, show in FIG. **8**. The input is a data stream **91** in a USB format, which contains the L/R (left/right) multi channel driver voltage information **92**. This information is provided to a track reproducer **99**, which converts the driver voltage information into mechanical movement (x,y), axis deflection by means of a linear variable displacement transducer or other micro movement device such as a stepper motor. The embedded phonographic cartridge is deflected by the track reproducer to produce analog audio signals that can be applied directly to standard audio circuitry.

Another example is a selenium analog reproduction device, shown in FIG. **9**. Differential voltages dV_L and dV_R developed from the encoder image structures are applied to LED sources **104** and **105** to produce a lumen intensity controlled by the changes in the applied voltage. A pressure/lumen sensor **106** produces analog audio driver signals (L,R) that can be applied to standard audio reproduction circuitry.

FIG. **10** shows an encoded image structure **108** which is the output of the mechanical image encoding process described above. A null driver **110** (software emulator), receives the recording data stream and converts it directly to standard available audio file formats, MP3, FLCC, etc **112**. The various files are digitally compatible for playback on various standard systems.

A related aspect of the present invention concerns the use of the present invention relative to film. Referring to FIG. **11**, a projectable film frame **118** is shown having an audio track **120**. The master audio tape information **122** is prerecorded and added during the manufacture of the film. The audio track can be directly imaged, such as by a light source, for example, a selenium detector **124**. The imaged audio track can also be encoded in the same way as the mechanical images discussed above, with direct image encoding at **126**, or mechanical parameter encoding at **128**. A digital data stream can be distributed or stored, with the original audio recovered at the receiving end, as discussed above, shown at audio out **130**.

Accordingly, the present invention, in various embodiments, is directed toward a system and process in which a mechanical image of an original audio source is produced, the mechanical image having all of the acoustic capability of the original audio. This signal can then be digitized and conveniently distributed or stored. The digital signal at the recovery end can then be processed to recover the original mechanical information, which can be processed using standard conventional audio processing systems to produce an audio play back which has the same quality as the original audio.

Although a preferred embodiment of the invention has been disclosed for purposes of illustration, it should be understood that various changes, modifications and substitutions may be incorporated in the embodiment without departing from the spirit of the invention, as defined by the claims which follow.

What is claimed is:

1. A system for maintaining quality of audio recordings, comprising:

wherein the audio recording is an original audio source media recording, containing original analog recording audio;

a mechanical production system for producing a mechanical image of the original audio source media recording,

a processing system for encoding the mechanical image information into a digital image file comprising an image structure and control information to enable audio reproduction of the original audio from the digital image file, the digital image file being capable of being transmitted or stored;

a processing system for recovering the mechanical image information in the digital image file; and

audio processing circuitry to produce the original analog recording audio from the recovered mechanical image information without standard losses associated with digital encoding of an analog source.

2. A system of claim **1** where the original audio source medium is a master source media tape.

3. The system of claim **2**, wherein the mechanical image is a track groove image of a master vinyl recording from the master source tape.

4. The system of claim **2**, wherein the mechanical image is produced from a magnetic tape with flux density representing the original audio source media.

5. The system of claim **3**, wherein the geometry of the track groove image is directly proportional to the differential drive voltages of the original Emv of the master recording.

6. The system of claim **5**, wherein the geometry of the track groove is defined by x and y dimensions and wherein the x/y position is determined by dvEmv, where Emv=dv=dx/dy.

7. The system of claim **4**, wherein change in differential voltages in the original audio are used to electromagnetically drive the production of varying densities of magnetic flux on the magnetic tape.

8. The system of claim **1**, wherein the processing system for recovering the mechanical track geometry includes at least one digital to analog converter.

9. The system of claim **1**, wherein the encoding system includes encoding of audio and control information.

10. The system of claim **1**, wherein the audio processing circuitry produces control voltages for application to analog devices for producing the original audio source media.

11. A process for maintaining quality recordings, comprising:

producing a mechanical image of an original audio source media recording having original analog recording audio;

encoding the mechanical image information into a digital image file comprising an image structure and control information to enable audio reproduction of the original audio from the digital image file, the digital image file capable of being transmitted or stored;

recovering the mechanical image information in the digital image file; and

producing the original analog recording audio from the recovered mechanical image information with audio processing circuitry without standard losses associated with digital encoding of audio material an analog source.

12. The process of claim **11**, wherein the original audio source medium is a master source tape.

13. The process of claim **12**, wherein the mechanical image is a track groove image of a master vinyl recording from the master source tape.

14. The process of claim **12**, wherein the mechanical image is produced from a magnetic tape with flux density representing the original audio source media.

15. The process of claim **13**, wherein the geometry of the track groove image is directly proportional to the differential drive voltages of the original Emv of the master recording.

16. The process of claim **14**, wherein change in differential voltages in the original audio are used to electromagnetically drive the production of varying densities of magnetic flux on the magnetic tape.

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